THE BUILDER

A Journal for the Architect & Constructor

APRIL 6, 1928 No. 4444

LEADING CONTENTS

ARTICLES

	PAGE
Leader : Building Exhibitions	561
Notes	562 & 563
General News	564
Meetings	564
English Villages : V. V. M. Christy	565
R.I.B.A. : Health and Recreation Centres	566 & 567
Modern Flats in London. By F. E. Bennett, A.R.I.B.A.	567
Repair of Ancient Buildings : XIV. By A. R. Powys, A.R.I.B.A.	568
Post-War Rash of Bungalows	569 & 570
Notes on Illustrations	570
Modern Cottage Construction	580
Romantic Episodes of Paris	579
"The Builder" Debate	579
Architecture, Nature and Magic : III. By W. R. Lethaby	581-583
Illuminating a Museum	583
Societies and Institutions	584 & 585
The Building Trades Exhibition : Commentary and a Forecast	586
Methods of Radiant Heat	587-589
Exhibition Notes	589
Legal Questions We Have Been Asked. By W. T. Creswell	589
Architects' and Builders' Inquiry Bureau	590
Everyday Science for Architects and Builders : XIII. By A. M. Giles	591
Water Supply to Separate Houses	592
What is a Perpetual Contract?	592
Intensive Training in the Building Industry	593
New Buildings in London	594
Contracts, Competitions, etc.	596 & 597
Current Prices for Building Work in London	600

ILLUSTRATIONS

INSET PLATE :

Plan of Building Trades Exhibition, Olympia.

	PAGE
Lloyds, Leadenhall-street : Detail of Committee Room Fireplace. Sir Edwin Cooper, architect	560
Lloyds, Leadenhall-street : Detail of Mantelpiece, Smoking Room. Sir Edwin Cooper, architect	563
English Villages	565
Lloyds, Leadenhall-street, E.C. Sir Edwin Cooper architect : Elliptical Vestibule	571
Lloyds, Leadenhall-street, E.C. Sir Edwin Cooper, architect : Corridor	572
Lloyds, Leadenhall-street, E.C. Sir Edwin Cooper, architect : Alcove of Elliptical Vestibule	573
Lloyds, Leadenhall-street, E.C. Sir Edwin Cooper, architect : "The Room"	574
Lloyds, Leadenhall-street, E.C. Sir Edwin Cooper, architect : "Detail of "The Room"	575 & 576
Lloyds, Leadenhall-street, E.C. Sir Edwin Cooper, architect : Committee Room	577
Shop Front at Cambridge. Mr. K. M. B. Cross, architect	578
Flats, Maldens and Coombe U.D.C. Mr. R. H. Jeffes, architect	578a
Garage at Hadley Green, near Barnet. Messrs. Bailey & Dudley, architects	578b
Army Vocational Training Centre, Aldershot	593

Published every Friday

THE BUILDER LIMITED

CATHERINE STREET AND YORK STREET, ALDWYCH, LONDON, W.C.2

Telephone : Regent 5940-1

86TH YEAR

Lloyds, Leadenhall Street, E.C.: Detail of Committee Room Fireplace.

SIR EDWIN COOPER, Architect. (*See also pages* 571-576.)

THE BUILDER

A JOURNAL FOR THE ARCHITECT AND CONSTRUCTOR

WITH WHICH IS INCORPORATED "THE BRITISH ARCHITECT."

VOL. CXXXIV. No. 4444. APRIL 6 1928.

BUILDING EXHIBITIONS

THE approach of Spring turns the mind of the housewife naturally to the annual domestic upheaval, and the desirable incidence of all works that would otherwise mean a repetition, to the dismay and mutiny of the household. The prospects of at least a couple of good building seasons may induce many others to bestir themselves to something more definite than vague projects. Out of this annual building "renaissance" comes the busy time for architect and builder alike, when fittings have to be selected in advance, the possibilities of new and improved building methods investigated, and the merits of new materials or new uses for old ones measured and tested.

Commerce has thrust out her tentacles into our farthest cities, and an army of increasingly efficient "men of the road" are at our doors with information and advice. But comparisons are hard to make when the mind has to carry a mental picture between business houses, or through the intervals between the calls of trade representatives. The uses of advertisement are well known, and now the exhibition custom has grown up to supply the means whereby the busy man may devote one day at least in the year to a close study of the point at which the building industry has arrived in its quest for the ideal thing in material and method.

We have had that excellent British Industries Fair in London and Birmingham, and we shall shortly be in the midst of the Building Trades Exhibition, which is intended chiefly for the technical man. There need be little, and in fact there is probably very little, overlapping between the two, for each sets itself a definite task.

Have building exhibitions fulfilled a real need for the community? There can be little doubt as to the answer, for a good deal of unreasonable conservatism has been broken down by the open display of fresh ideas, and a good deal of sound conservatism has been confirmed by open comparison between old and tried goods and showy tawdriness laid out side by side. Established houses, the quality of whose products have been always beyond question, have had to keep up with the stiff pace in prices which has been set by open competition; and the new establishments have found a high standard of quality in existence to which they have perforce to comply if they are to have the faintest hope of success. The exhibition system, also, has doubtless been the prime factor in releasing the housewife from such tyrannies as the old-fashioned kitchen range and side boiler, with its voracious appetite for fuel, its endless fetching and carrying of hot and cold water, and its temperamental foibles when in action. It is only on the market stall that the trifling extra cost of taps and fittings that can be easily cleaned is apparent, often imagined as Utopian luxuries for the wealthy only. Such things have to be thrust under the nose of the average Englishman before he will make even a show of interest.

The average architect is, after all, not so different from the average Englishman, and as suspicious of change in any form. He is rightly loath to turn from the old established firms who have served him so well in the past and who have never yet "let him down"; and deal with those whose names did not exist when he was a young man, or who have no traditions of long associations to bind their interests to his. He is reluctant to discard materials that are certain to give good service by very reason of their abundant factor of safety, and turn to others more problematical; but he can learn.

And so it comes about that the traveller breaking fresh ground finds it a hard task to gain the ear of principals, while men who should be on tip-toe for improvement may answer the question whether they intend to visit the exhibitions with a curt negative. We have all of us a lot to learn.

We commend these considerations to the architect and builder of to-day, and urge them neither to stick to the old just because it is old, nor to lose their heads over the new just because it is new. It is a composite of the Die-hard and the Radical that really regulates the progress of our age, and we can think of no atmosphere more conducive to this product of the average than that of a well-organised Exhibition, where firms of historical tradition may thrive side by side with the ambitious newcomer.

Has the need for this class of exhibition expended itself? Reviewing the results which the past decade has to show for its exertions, it would be difficult to support the opinion that we have yet arrived at anywhere near the point of ideal building method or material, or that we have been shown all that can be done to improve them. Costs, falling slightly, it may be true, still waver round a point that shows little relative improvement against the pre-war, if values be considered as relative to the cost of living generally. The building industry has nothing to show comparable with the organisation that has enabled the motor-car industry to supply goods at pre-war prices under post-war conditions. Building is still a comparatively slow and laborious process, though the call for new building becomes increasingly insistent.

It becomes, therefore, a matter of urgency that every opportunity should be seized whereby each new discovery, or each fancied new discovery, may be made accessible to the public and to their technical advisers at regular periods. It is also of importance that the British taste for quality should thrive in an atmosphere of keen competition lest it be stifled in impossible costs; and there is no field of competition so keen as in the market-place.

In this connection it is encouraging to note that the number of old-established firms which have gone out of business since the war is extraordinarily few considering the desperate competition against which they have to contend. Year after year the old names take their place afresh, like trusted friends, and one feels the stronger conviction that the British obsession for excellence of workmanship is no mere fetish, but still the clear road along which this country is regaining her pre-eminence in world commerce. But this solid stability must be maintained in an atmosphere of fair trade and free competition if we are to hold on to what we have gained, and recover what we have lost. Youth will be served, in building, as in all other branches of human activity; and it is the Building Exhibition that is designed to serve both youth and tradition.

Are there any directions in which these exhibitions might be improved or made more serviceable for their avowed purpose? Year by year these displays take place and the unspoken criticism of the previous year has been met by some improvement, and there is indeed little that can be suggested now that they have reached such a high level of efficiency. A little more display of current prices without reference to the local representative might be adopted by many exhibitors with advantage to all concerned. The up-to-date priced catalogue may be an impossible production in some industries where prices still show little indication of becoming stabilised, but for the period of the exhibition it should not be so impossible to set an obvious price on the goods displayed, and so save many fruitless inquiries. We commend this to intending exhibitors.

This is, after all, a very minor point, and leaves beyond criticism the broad lines on which the modern exhibition is directed in this country, and to most that are interested these displays of progress and stability supply an opportunity of instruction quite unique, and a pleasant way of spending a day in harness.

NOTES

Vanishing London.

"The power of the purse has spoken and there is an end of it." The above quotation of a letter from Mr. Tapper, the President of the R.I.B.A., has a very real significance for all of us in every department of life, but for those who love their London these gloomy words suggest a portent of disaster. But is there an end or it? It is the duty of all who have the well-being of London at heart to put forth all their efforts to save London from the influences of the commercial greed which threatens her.

The Appeal for Beauty.

We ask our readers to make some response to the almost despairing appeal of the President. We can all do something, for it is the cumulative result of much individual effort which in the end achieves great results. Besides those who desire to make money profits out of the development of London, we have those who claim that beautiful or historic old buildings cannot be allowed to interfere with the growth of enterprise and the development of modern life, and beyond this there is a feeling of indifference about the citizens of London generally which is the despair of all those who try to visualise a beautiful and perfect city.

An Immediate Problem.

A very serious effort is called for at the present time to make it clear to our authorities that a great city cannot be left to the blind chances of commercialism and momentary convenience. With such difficult problems as the railways, the tramways, the bridges, and the roadways, it is absolutely essential to take long views and think of what the future is to be. Can we possibly take any wise steps about bridge-building or road transport until we have faced the future of railway traffic, as to whether it is to be over the river or under it? That is the first outstanding problem which should be faced. The London Society realised this years ago and recorded the fact in its resolutions. What is the London Society doing now? How does it come about that the Royal Commission on bridges, with so able a chairman, has apparently left out of count this serious question of overhead or underground railway traffic, and provides us with a pretentous double-decked bridge for Charing Cross still further to destroy the amenities which the removal of all overhead railways would do so much to preserve? We know that the railways have a duty to their shareholders, but behind and above that is their duty to serve the public convenience, and the public can claim the proper fulfilment of that duty. Is it not about time to have discovered that the antiquated and absurd conditions of the Charing Cross and the Cannon Street Railway Stations should be brought to an end? We claim that the solution of the difficult problem of bridges and road traffic is in our pockets, and that it does not exclude proper compensation to the railway for the disturbance of its present unfortunate condition.

The Authority for an Appeal.

We have a large number of well-meaning people who will bestir themselves to aid the waifs and strays of life, who try to alleviate the lot of the poor and suffering and will even try to save a murderer from his just fate. These efforts meet with widespread and astonishing results. But to whom shall we appeal for the protection of the beauties of our city and for its right development in its future growth? The serious fact is that there is no one definite and all-powerful authority to whom an appeal can be made. We admire our London County Council and the ability which governs its work, and we cannot doubt its real desire to make London as perfect a city as it may be. But opinions are divided and behind that are the financial problems which cannot be ignored. How shall an appeal for the beauty and amenity of London succeed in face of all these difficult considerations?

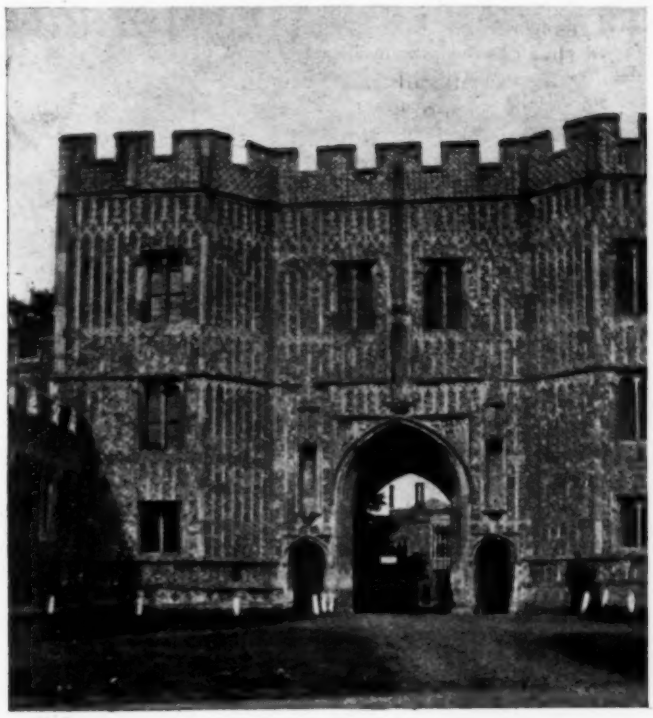
A Drawing attributed to Alfred Stevens.

The Value of a Practice.

What is the selling value of an architect's practice? To many of our troubled brethren of the profession such a question will probably seem something like a joke. But a correspondent asks the question in all seriousness, for he has noted that for a medical practice the purchasing price has been fixed at one year's income, whilst he has seen an architectural practice offered for its five years' income. Obviously the generally precarious conditions which govern an architect's income hardly apply in the case of a medical man, but notwithstanding that we can quite believe that an architectural practice of a certain kind might be worth five years' purchase. We all know well enough that the architect has to justify himself by some sound basic knowledge of constructional work, but that is what a surveyor or an engineer could also claim, and the one outstanding quality we desire in the architect is his capacity to clothe practical necessities and ideal work in a form of beauty. If an architect has succeeded in this, we may reasonably ask whether he can pass his artistic instincts on to another by a mere money payment.

University of London, Bartlett School of Architecture.

The Annual Report by the University Professor of Architecture, Mr. A. E. Richardson, has just been issued. It will be remembered that the Bartlett School of Architecture is the result of a fusion of the King's College and University College Schools of Architecture that was carried out in 1914, for which a new building and equipment was provided by the generosity of the late Sir Herbert Bartlett, Bt. Since that time, the architectural curriculum has been entirely reorganised and now occupies a period, of five years of which four-and-a half years are spent in the school and the final half-year in an architect's office. Among the other developments of the period are to be noted the establishment of a University degree in Architecture, the institution of a department of Town Planning, and, on the Bloomsbury site, of an Atelier. There were 174 students in the school last year, and the Professor of Architecture is able to record some noteworthy successes. Four students were admitted to the Final Competition for the Rome Scholarship, and one, Mr. H. T. Dyer, was awarded the R.I.B.A. Henry Jarvis Rome Studentship of the value of £250 per annum; the same student obtained the R.I.B.A. Victory Scholarship. Mr. M. Smith was placed third in the open competition and was exempted from the pre-



St. Osyth: Priory Gatehouse of Elaborate Flintwork.
(*See page 565.*)

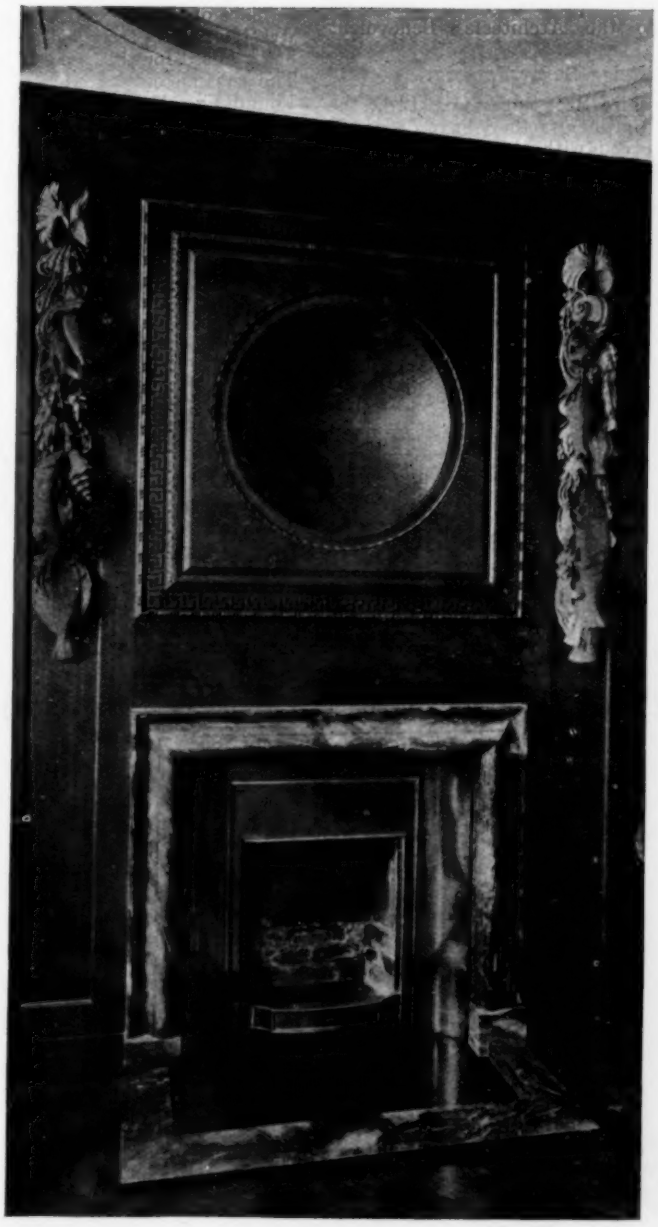
liminary competition for the Rome Scholarship in 1927-28. Out of the ten students selected from the whole country for the final competition for the Rome Scholarship of this year, six came from the Bartlett School. The Soane Prize of the R.I.B.A. has been awarded to Mr. L. W. T. White, of the Atelier. The institution of this Atelier has given facilities that did not previously exist for the students to enter for competitions.

The Rating and Valuation Bill

In our article last week on the Rating and Valuation Bill we called attention to Clause 4 which provides that on the representation of the Central Valuation Committee that a substantial question of law has arisen in relation to the valuation of hereditaments and that unless the question is authoritatively determined want of uniformity in valuation may ensue, the Minister may submit the question to the High Court for its opinion, and the Central Valuation Committee may appear as parties, and we expressed the opinion that this clause required further consideration. This view received support in the House of Lords on the second reading of the Bill, and some suggestion appears to have been made during the debate that administrative influence might be brought to bear on the Judges, but we need hardly say that was not an objection we took to the clause. So far as we know there has never been the least attempt on the part of any administration to give direction to the Judges; the complaint of modern times has rather been that the administration itself usurps the functions of the Judges by substituting bureaucratic control. This clause is free from any such objection as the matter goes before the Court, but our objection was founded on the fact that while the Central Valuation Committee would be parties to the proceedings, adequate provision was not made for the appearance of other parties to defend a matter of principle possibly involving a large class of ratepayers, as any contribution to their costs was left entirely in the discretion of the Valuation Committee, and the clause leaves it uncertain whether a successful party could be awarded costs by the Court.

The Dublin Coast.

It is pleasant to note that a committee has been formed in Dalkey and Killiney to purchase seven acres of land with a frontage of 520 yards between Vico-road and the sea. This stretch of coast road, with its eucalyptus groves, within seven miles of Dublin, need fear no comparison with the finest sea and mountain views on the Riviera or in Cornwall, and it would be a calamity to allow it to be covered with bungalows. Through the public-spirited action of the owner, Mr. Leary, the total cost necessary to reserve the site to the public in perpetuity will amount only to some £1,500, which will have to be raised by subscription. We hope that this appeal will meet with the response that it deserves.



Lloyds, Leadenhall Street, E.C.: Detail of Smoking Room Fireplace.
Sir Edwin Cooper, Architect.

GENERAL NEWS

Professional Announcements.

Mr. R. S. Davey, of Hayes, Middlesex, has been appointed surveyor to Carshalton Urban District Council.

The Glasgow City Engineer has intimated to the General Finance Committee that he proposes to recommend the promotion to Chief Architect of Mr. Thomas G. Gilmour, A.R.I.B.A.

Mr. John Bertram Wills.

We record with regret the death, on March 30, 1928, at 15, Berkeley-square, Bristol, of Mr. John Bertram Wills, F.R.I.B.A., the third son of Sir Frank and Lady Wills, aged 45.

O.U.B.C. Boat House.

We learn that an appeal for funds has been issued on behalf of proposed extensions to the Oxford University Boat House. Plans for the proposed extensions have been approved at a cost of about £4,000. Cheques are payable to the Hon. Treasurer, Oxford Boat House Centenary Fund, 4, Broad-street-place, E.C. 2.

Mr. Hilton Nash's Estate.

Mr. Walter Hilton Nash, F.R.I.B.A., of De Vere gardens, W., for 20 years architect to the Merchant Taylors' Company, and for many years hon. treasurer of the Architects' Benevolent Society, who died on December 18, aged 77, left estate of the gross value of £47,422, with net personalty £47,349. He gives £200 to the Architects' Benevolent Society.

The Brigg Sugar Factory.

The Lincolnshire Beet Sugar Co., Ltd., the owners of the Bardney factory, have definitely decided to proceed with this scheme, and it is learned that a new company has been formed to build a £300,000 factory at Brigg, to be erected by Sir Robert McAlpine and Sons, Ltd., in conjunction with the Dyer Co., Ltd. Work is to be proceeded on the building immediately.

Widening of Prince's-street, E.C.

The City Corporation have prepared a scheme for widening Prince's-street at a cost of £250,000.

Market Square Scheme, Nottingham.

We learn that the scheme of Mr. T. Cecil Howitt, A.R.I.B.A., for the development of Market-square, Nottingham, has been formally approved by the City Council.

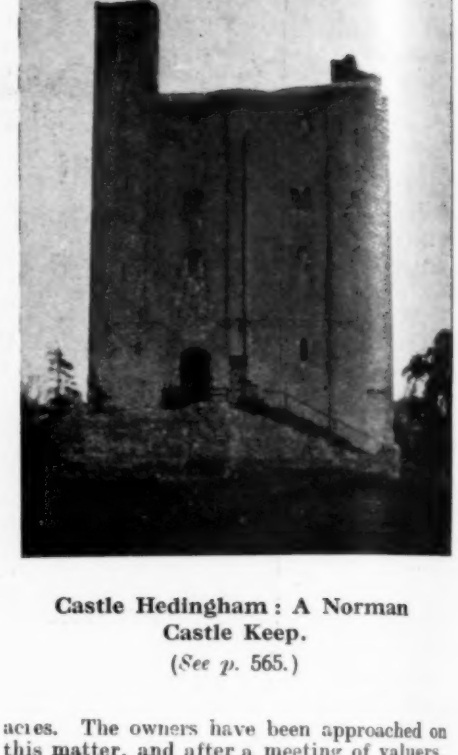
The Royal Sanitary Institute.

The programme for the 39th Congress of the Institute, which is to be held at Plymouth from July 16 till July 21, by invitation of the Town Council, is well advanced. Already some 500 delegates have been appointed by the Admiralty, the Air Ministry, Welsh Board of Health of the Ministry of Health, the Ministry of Home Affairs for Northern Ireland, the War Office, and 300 sanitary authorities, societies, and universities in all parts of Great Britain, and representatives will be attending from the Dominions and foreign countries. The Ministry of Health, the Scottish Office, the Ministry of Home Affairs for Northern Ireland, and the Ministry of Local Government, Irish Free State, have agreed to consider applications from Local Authorities for sanction to reasonable expenses of delegates attending the Congress.

Foundling Hospital Site.

Negotiations are in progress to secure the Foundling Hospital site, Bloomsbury, for the building of a new hospital for sick children in place of the hospital now in Great Ormond-street, and to preserve the land which would not be used for this purpose as an open space. The scheme originated with members of the Foundling Estate Protection Association According to the *Times*, it has been favourably received by the board of management of the Hospital for Sick Children, and a provisional committee representing that institution and the association has been formed to study the preliminary measures. The success of the enterprise will depend largely on the price required for the site, which covers nine acres. The owners have been approached on this matter, and after a meeting of valuers, which will be held shortly in order to fix the amount, the subject will again be considered by the hospital board.

Castle Hedingham. (*See page* 565.)



Castle Hedingham: A Norman Castle Keep.
(*See p.* 565.)

Blackfriars Priory.

In the course of renovation work at Apothecaries' Hall, Water-lane, E.C., a wall believed to be part of Blackfriars Priory has been uncovered. It is in a good state of preservation, says the *Times*, and the marks made by moss and lichen on the Kentish ragstone are still apparent. When the Society of Apothecaries rebuilt their hall after the Great Fire this wall was used as a foundation, and only the necessity of cutting into the brick courses of the wine cellar in the process of strengthening the present hall against the weakening effects of the death-watch beetle and damp in the timbers has brought to light this fragment of the former monastery.

MEETINGS

Saturday, *April* 7.

Edinburgh Architectural Association. Visit to Astley Ainslie Institution.

Tuesday, *April* 10.

Institution of Structural Engineers (*Midland Counties Branch*). Mr. D. G. Mackintosh on "Erection of Steel Bridges." At the Chamber of Commerce, Birmingham. 7 p.m.

Thursday, *April* 12.

London Society. Visit to Headquarters of the British and Foreign Bible Society, 146, Queen Victoria-street, E.C.4. 3 p.m.

Institution of Structural Engineers. Mr. Harvey W. Corbett on "Steel and Speed." 8 p.m.

Sheffield, South Yorkshire and District Society of Architects and Surveyors. Annual General Meeting. At the University, Sheffield. 6 p.m.

Friday, *April* 13.

Building Trades Exhibition. Opening by the President of the R.I.B.A. At Olympia, W.14.

Royal Sanitary Institute. Discussion on "The Health of Hop Pickers and the Sanitation of Hop Pickers' Encampments." At the Sessions House, Maidstone. 5 p.m.

Incorporated Association of Architects and Surveyors. Mr. W. E. Bush on "Electric Lighting." At 15, Savoy-street, W.C. 2. 7 p.m.

ENGLISH VILLAGES—V

By V. M. CHRISTY.

Such villages as fall into the "feudal" category now being considered often consist of irregular groups and lines of cottages, inns, store-places and trade buildings, possibly set in the former lines of various subsidiary portions of the castle defences, or perhaps in a series of intricate lanes and alleys, such as would facilitate defence in mediæval times, and make attack on fortress or manor-house a risky undertaking. Ill-intentioned neighbours might well find that the unfamiliar turns and twists concealed unexpected defenders. The church in such villages is sometimes found near the lord's dwelling, or even actually within his grounds; or it may be at some more distant corner of the village, possibly suitable for supplementary defensive purposes. In many small villages a handsome church of disproportionate size testifies to the expression in building of the power or piety of some local family of importance in bygone days. In a "monastic" village the parochial portion of a fine church may be all that remains of some acres of beautiful conventual buildings. Perhaps a mill may still be found on a convenient stream at sufficient distance from the dwellings for the use of the water by the villagers to be unaffected by the needs of the miller.

As indicated in the case of "green" and "street" villages, so with the feudal or monastic village certain place-names give a clue to the kind of plan one may expect to find. Three of the accompanying illustrations are from the village distinguished by the name of Castle Hedingham. The keep stands on a tall, artificial mound on a natural eminence (p. 564), while the church is some distance away among the lesser buildings (Fig. 1). The irregular formation of the village suggests additional defensive character (p. 564), while in the wide spaces one might more readily visualise the assembling of men-at-arms than the peaceful gossip of the green, the commercial rivalry of the market-place, or the traffic of the street.

Among interesting indications of ecclesiastical ownership may be mentioned places whose names include the word *Temple*, recording former possession by the Knights Templars, and perhaps showing visible evidence in remnants of some building such as a round church or some other characteristic form. Temple Balsall and Cressing Temple are examples. Sometimes the name of the founder or patron saint of a monastery may be discovered in the place-name. In the case of the Priory of St. Osyth the Saxon village discarded its former name and became St. Osyth. The flint gatehouse of this priory (p. 563) shows a glimpse of the oriel window within the courtyard, dating apparently from the time of the transformation of an ecclesiastical building into a private residence for a lay lord. An open space now divides the lesser dwellings and the village church from the monastic group which forms the dominant feature of the village.

[Fig. 1. Castle Hedingham Church and Village.

An illustration is given of a village showing definite effects of the wave of enthusiasm for village improvement in Victorian times, when opportunities were seized of combining utility and philanthropy with the expression of the sense of the security and prosperity of the time in some form of large-scale "landscape gardening" or similar activities. In Fig. 2, part of a village is viewed from within the park gates of the mansion. The older cottages with overhanging upper story are seen framed in by modest but dignified newer versions of house-building in similar materials, but with additional attractions supplied by bay window and projecting porch. In the case of another "model village" of the nineteenth century, the village stretches from the main entrance to the grounds of the big house, to where, at the old church, great brick piers with stone vases upon them and an iron grille above the gate mark the private entrance to the churchyard from the other extremity of the park. The houses here are perhaps a trifle pretentious, in their "Tudor" rusticity, but they mark an important and significant phase in the evolution of the "feudal" village type, and demonstrate the thought, care and expense lavished by a conscientious owner half-a-century or more ago.

In our own days, when larger estates tend to be broken up, and the landlord's lot is a precarious one, it is seldom that village planning of so definitely a "feudal" kind can be undertaken by individuals on so extensive a scale. The large amount of private housing enterprise of to-day falls into another group than that being dealt with in this and the preceding article. The modern expression of the same patriarchial or feudal spirit, however, still finds expression, though on a small scale, in the erection of groups or single cottages for the accommodation of gardeners, keepers, estate staff, and agricultural labourers on farms connected with one of the lesser country houses, or owned by some "gentleman farmer" not entirely dependent on his farm for a livelihood.

Fig. 2. "Feudal" Village at Gates of a Mansion.

Different in origin as well as in style are the batches of Council houses which, however, are generally placed on land at some little distance from the true nucleus of village life. Sometimes they seem to form a separate village group, and their materials and design too often mark them as alien to their surroundings Whatever the type of village, whether "green," "street," or "feudal," all are one to the generality of local authorities, and thus the obliteration of clearly-marked types of old plan or old growth is very easily and rapidly effected. Moreover, it is too rarely that any protest is attempted against the destruction of local landmarks of interest in the village, or of trees which contribute to its beauty, where housing questions are concerned. The Victorian landlord planted trees to increase the amenities of his village; local authorities or new owners of to-day fell them. It is worthy of note that where protest is made satisfactory results are often produced. For instance, a number of new Council houses were to be erected in a village, and timely local protest prevented the felling of a fine avenue of trees leading to the village church, reconsideration of the scheme revealing the fact that the houses could easily be set back the few feet necessary to preserve the otherwise doomed avenue

Finally, mention must be made of model villages, such as that around the pseudo-Norman castle-like mansion of Lord Penryn, near the slate quarries, for this is an example of a modern village on definite "feudal" lines. The nucleus of the grouping is the dwelling of the landowner. Such villages as that form a link between the ancient feudal group, of which the "ducal" villages of last century marked a climax, and the model villages and garden cities so important in the eyes of social student and town-planner to-day. Related to these two phases, however, is another distinct type, the older industrial village, with whose origins and development it is proposed to deal briefly in the next article.

(To be continued.)

HEALTH AND RECREATION CENTRES.

At a meeting of the R.I.B.A. held on Monday evening last (the President, Mr. Walter Tapper, A.R.A., in the chair), Mr. J. Murray Easton, F.R.I.B.A., read a paper on this subject, dealing especially with the post-war development of health and recreation centres on the Continent, more particularly in the industrial regions of the Rhine. In the German industrial town of to-day, he said, the manufacturer gloried in his factories, and called in distinguished architects to design them, not in the rather sentimental manner of our cocoa millionaires, but to express the beauty, efficiency, and even ruthlessness of the machine. He endeavoured to provide his workers with surroundings and means to increase their efficiency and vitality, and it was impossible to travel in Germany without being impressed by this sense of energy and hopefulness, and without feeling ashamed at the contrast which was offered by so many of our industrial towns. Dusseldorf was the most northerly of the Rhine towns which he visited, and in 1926 it was the scene of an exhibition specially related to his subject. The full title of this exhibition was "The United Exhibition of Health, Social Service, and Gymnastics." There was not much trace of recreation, still less of amusement, in this title, but the exhibition fully catered for health, and summed up the results of recent discoveries. The ground took the form of a long, narrow strip, and the buildings were dominated at the south end by the Planetarium, which stood at the approach to the Rhine bridge. The Planetarium itself was a remarkable building, and illustrated the German desire to make science interesting and even exciting. It consisted of a central hall, surmounted by a dome supported on an arcade of brick piers with corbelled heads. All the lighting was artificial, and the contrast between the white plaster dome, upon which the image of the planetary system was projected, and the plum-coloured brickwork of the lower part was exceedingly dramatic. Even more spectacular was the entrance hall, the sides of which converged at either end to produce an effect of perspective. Both exterior and interior constituted an example of brick craftsmanship. All through the exhibition they were confronted with the pursuit of health. The exterior was in character with the rest of the buildings, nearly all of which were designed by Professor Kreis. About two miles further from the centre of the town lay the Stadion, served by a tramway and good roads, but the bicycle seemed to be the chief means of access. It consisted of a large stadium, an open-air swimming-bath, with playing-fields and about 20 tennis-courts.

Cologne, under the Treaty of Versailles, had to surrender its fortifications, and further possibilities of development on modern lines came into being. Under a far-sighted municipal government a new regional and economic development of the city was planned. This included the transformation of the fortified belt into a great system of parks and open spaces, and outside this belt the superseding of the concentric planning hitherto followed, by the creation of semi-independent centres. The building of a new harbour, and the general laying down of comprehensive plans for the development of industrial housing schemes and means of communication were also proceeded with. Professor Schumacher, whose work in Hamburg was well known, was appointed to work out the town-planning scheme, and some of the most able architects of Cologne were given opportunities to carry out the several parts of the scheme.

The design of the various stadia, etc., depended very largely on the tree planting, and when the trees and hedges had reached maturity the effect would be exceedingly fine. The swimming bath was arranged with the usual 100 metre championship area in the centre, a diving place at one end and a non-swimmers' place at the other, and close at hand were places for light and air bathing. The German did not attach too great importance to bright sunlight for light bathing, and he was perfectly prepared to enjoy lying on a bench in the open air even on a dull day. The pool itself was of reinforced concrete construction, and the excavated soil had been used to form a terraced embankment for a sitting and standing audience. The stadia were arranged as follows:—The central stadium had a covered stand on one side, and was for the most important athletic events. Those on either side were for light athletics. The oval stadium on the right hand was a cycle racing track, the rectangular one next to it being for heavy athletics. There were playing fields on either side of the main avenue and to the left were hockey grounds, tennis-courts with a championship court, and further on the left side of the swimming pool was an equestrian ring. There were other tennis-courts to right and left of the dressing-rooms. The return portion of the dressing-room blocks had not yet been completed. These would flank the avenue to the principal stadium with colonnades, but even as it stood the dressing-room and gymnasium accommodation was very good. On the ground floor changing rooms for clubs, etc., were provided, with lavatory accommodation. On the first floor were dressing-rooms and a gymnasium. Shower-baths were also provided. The stadion was the most important, but only one of many playing grounds in or near the city which was well equipped with tennis-courts, cycle tracks, and football grounds.

Wiesbaden was an independent health centre, and one of the most complete examples of the Continental spa. It was situated on a spur of the Taunus Mountains, two or three miles from the Rhine. The town itself and its surroundings were extremely attractive, but its lay-out did not call for much comment. The planting of the public gardens was somewhat Victorian in character, but everything could be described as mature; and the facilities for public entertainment were lavish. The plan of the Kurhaus was of that formal and grandiose type, which, in this country, rarely got further than paper. The whole scheme had been carried through with Teutonic thoroughness, and without being inspired the building was very well handled.

Of all the places which he visited Frankfort was pre-eminent in the completeness with which she had provided for the health and recreation of her citizens. This city was finely situated on the Main. Its activity and prosperity were most apparent, and under the direction of Stadrat May, Frankfort had since the war, inaugurated schemes of the most complete nature for the creation of pleasant and healthy conditions. Having given a careful description of the work, the lecturer said it was difficult to exaggerate the attractions of the whole place. The benefit to the community of seeing and participating in games in such surroundings must be very great, and the contrast with most of our gaunt football grounds, wedged between factories and gasworks, was overwhelming.

Vienna, like Cologne, owed the most striking part of its lay-out, the Ring, to the demolition of its fortifications in the middle of the nineteenth century, and it owed to its royal and noble residents the chain of gardens and open spaces which distinguish it. The town had provided numerous playing fields and grounds in various parts of the city, but its most striking contribution had been the new Amalienbad—public baths in a working-class quarter. This building might well be criticised on the ground that too much had been expended on one building in one isolated part of the city, but the building itself was certainly an achievement. It consisted of a large swimming bath, 33 metres by 12 metres, with two galleries of dressing boxes. On each floor, those on the right hand were for women, on the left hand for men, and there were separate staircases for each sex. After undressing, the bathers must take a shower bath, and in order to prevent dirt from the floor being taken into the bath they must wade through a shallow pool adjacent to the bath. The remainder of the building on the third floor level was devoted to every kind of bath—steam, douches, Turkish, Russian and shower-baths. They were graded as first and second class, and charges were very low. The fourth story was given up to special treatment, electric light, X-rays, etc. The fifth story was partly a roof garden given up to light and air baths, and hot and cold plunges were provided. The building was of reinforced concrete and brickwork, rendered externally. It was a bold design, but it did not bear comparison with the best of the Viennese flats. The inside, however, was from the technical point of view, admirably finished, although the decoration was not so satisfactory. Practically the whole building was tiled. In the neighbourhood of Vienna were to be found numerous and well laid out health and other resorts, the best known of which was Baden, a spa noted for treatment of chest complaints. Vienna also possessed several river bathing establishments, but none of these were of any particular note.

His last example of a municipal recreation centre was the new stadium at Lyon. Lyon had been fortunate in the architectural expression of its very vigorous civil life by M. Tony Garnier. The hospital group, the cattle market and abattoirs and the town-planning scheme which he had produced were fairly well known and he had designed a stadium which was a first-rate example of its type. It lay on the flat land to the south of the town, just below the confluence of the Rhone and Saone, and had very good road communication with the centre. The stadium belonged to the more traditional Roman type, its architectural treatment carried right through the arena, and in itself it was a much more spectacular structure than the German ones. Sporting events of all kinds were made possible by the planning. The general shape was a rectangle, with semi-circular ends and a cycle track 600 metres long, a pedestrian and running track 300 metres long, a football ground, and smaller spaces for such Olympic sports as throwing the discus were provided. The inclusion of a cycle race track presented difficulties in the section owing to the necessity for banking up at the ends. This had been ingeniously overcome by the provision of a promenade in front of the seats at these ends. The whole structure was carried out in reinforced concrete.

In the design of open-air bathing pools the problem of catering for swimmers and non-swimmers immediately presented itself. Where space was badly restricted it was met by the usual arrangement of a pool with a shallow and a deep end, as at Vislau. This, however, was undesirable, as bathers interfered with the swimmers and non-swimmers were apt to get out of their depth. A better arrangement, but one which was

rather apt to be unhappy in appearance, was the division into two parts of the whole space, as at Baden. By far the most satisfactory solution, however, was the arrangement at Frankfort.

He had visited most of the open-air swimming pools in this country, and excellent as were such ones as Scarborough and Blackpool, they did not compare as a solution of the problem with Frankfort. The complete separation of the championship area from the bathing pool was, he thought, very desirable. At Frankfort it was divided by a bridge into the championship area 100 metres long and a shorter portion for diving. The seating accommodation for spectators was arranged fairly close to the pool, and had a steep angle, required by the fact that the picture plane of water sports was a horizontal one. This enabled the bathing pool to be kept quite open, with plenty of space round it, since the question of spectators did not occur. The bathers had ample space to run about and play games on the grass, and although this made the pool more difficult to keep clean, it added enormously to its value. It was mostly found that even where water was plentiful a system of filtering, sterilising, and aerating the water was the most economical, and it could be carried out continuously, and disposed of the old difficulty of the emptying and filling of large pools. The apparatus generally employed consisted of filtering cylinders filled with gravel or some other medium. The water could pass through these, was sterilised, pumped up, and discharged in the open air in some sort of cascade for the purpose of thoroughly impregnating it with air.

Discussion.

Dr. Raymond Unwin, proposing a vote of thanks to the lecturer, said the British public did not realise the advantages of getting properly qualified architects to lay out their playing fields and athletic grounds. The public were better educated in these things on the Continent and in America.

Mr. Harding Thompson, seconding the motion, pointed out the difficulties of transport and catering that were a consequence of the concentration of stadia, as at Frankfort. It was, perhaps, better to distribute these elements, as we did in this country.

Mrs. Blanco White having contributed a few remarks to the discussion,

Mr. Ronald Jones said he thought the London County Council's method of dotting features about the London parks was more typical of the national point of view than to have them designed architecturally. He noticed the great amount of space given up to spectators in the Continental arenas. Here we made provision for a great number of players instead.

Mr. F. R. Yerbury said that the Frankfort Stadion cost about three million marks, or £150,000, which was very cheap for the accommodation provided. The land was cheaply acquired and the work was carried out by unemployed labour. On the Continent the recreation movement was comparatively new, but we as a nation had had public baths for years, which was, perhaps, why our efforts seemed a little old-fashioned.

Mr. Howard Robertson said he thought we were rather amateurish in our efforts to provide recreational facilities. On the Continent they tackled these problems scientifically.

Mr. Francis Hooper said he hoped that the paper would be widely circulated throughout the Empire, in many parts of which open-air bathing was possible, even though it might not be in this country.

Mr. H. M. Fletcher said we wanted our haphazard methods to be corrected. If we went to the Black Country, the Potteries, or South Wales, we should not find such facilities for recreation as were found in London, and architecture was needed as a corrective.

Mr. Gilbert Jenkins said our recreational centres would be far better if they were laid out by men who really knew what design was.

MODERN FLATS IN LONDON

By F. E. BENNETT, A.R.I.B.A.

1.—The Changing Order.

A big change is taking place in the order of London life. The long-established idea of the "Englishman's Home" is, for the Londoner, coming under revision. The ideal of a self-contained home, with its own garden, to be possessed by every Englishman, righ and poor, as an ideal is slowly but surely losing favour. What was once considered by every Londoner to be the ideal domestic environment is now being looked upon by many as, perhaps, not such a perfect ideal after all. In fact, Londoners tend more and more every year to be flat-dwellers.

The movement towards flat-dwelling is twofold; it is taking place in two directions. On the one hand, the stately houses, with ponderous porches, which spread around London during the latter part of the nineteenth century at Belgravia and Chelsea, at Regent's Park and Bloomsbury, at Earl's Court and Holland Park, and many other districts, which absorbed great numbers of the upper middle class and bear witness to the prosperity of England at that time, are coming under the changing order. Great numbers of them are now vacated by complete families and being taken over by small speculators, who make alterations, add partitions and bathrooms, and re-let the houses subdivided into two, three, or more flats. On the other hand, a great activity is taking place in the building of new flats. Tall blocks of new flat buildings have sprung up in many places, and one sees preparations going forward for still many more. Starting here and there with an odd one about twenty years ago, the growth has been steadily going on until the present time. Now, in the nature of a climax, we suddenly find Grosvenor House has disappeared and a great block of flats of enormous dimensions has suddenly appeared right in the heart of our most cherished and venerated residential quarter. A hole has been knocked clean in the centre of Park Lane. If anything serves to show the sign of the times, this does. The old Park Lane of fond memory, the street which has held so long the public imagination as the centre of aristocratic refinement, has lost its heart. It can never be the same Park Lane again. We have seen Devonshire House, too, vanish in the same way. And there are other old familiar buildings which have gone to make room for the new order. And now there are many other blocks of flats being built or about to be built. It is not easy to say how many, but it is certain there are many plots of land either definitely allocated or being seriously considered for the purpose.

Against this conception of change in London, and apparently suggesting the contrary, may be stated the fact that a million self-contained houses have been built in England since the War, of which a great number are in or around London. These houses, however, have only served to meet the normal demand which would have existed during the war period and since. These million were wanted to make up a deficiency in the normal supply, and had to be fostered by the State. But now, where plots of land become available for rebuilding, the speculator is not so ready to rush in and put up his small villas. The opportunity he looks for is a small, cheap site in a good situation, where he can pile dwellings one on top of the other, making his block of high-rent flats.

It is remarkable that, although many houses of the smaller type supported by Government subsidies have been built, very few of the larger ones have come into existence. Do we see anywhere rows of ten-roomed houses built as a speculation as they were fifty or sixty years ago?

The thoughts of the change which is taking place may not be to many people a pleasant one. The disappearance of places of old associations is disturbing, and we are inclined to revile the busy speculators who are so ready to destroy good old buildings for the sake of good profits. The fact of the change, however, we cannot ignore. We are bound to face it and to be prepared to find its advantages and its good points.

What has brought about the change? It is undoubtedly the alteration in our mode of life and the new influences in our domestic existence. We are less inclined to pay high rents; we desire a greater mobility in our movements; we want freedom to change rapidly, to go abroad and leave our homes locked up for fairly long periods. The strain of our lives is greater; there is more noise and speed, and we work and play harder. We like city life. There is a greater desire for extremes and maximums—tiny sitting-rooms and enormous picture palaces. In our more immediate domestic life, while we are constantly in trouble over the lack of servant labour, we have, however, done away with some cumbersome habits. We have smaller kitchens; we are less inclined to collect bric-a-brac; heavy curtains and the larger pieces of furniture have been removed; there are better arrangements for heating, ventilation, lighting, sanitation, and fire prevention.

With the prospect in view of a great increase in the number of flats to be built, it will be well to consider carefully what forms the new development is likely to take, and in order to arm ourselves against troubles that may arise. Also, we must be prepared to grasp the good that may come of it. There is a chance now, while we may be able to realise the probable future, to impose wise restrictions and conversely to remove impositions which may clog the wheels of healthy progress.

Before proceeding to any consideration of the building that has already been done and is now being done, mention should be made of some of the considerations which govern the erection and the continued existence of a building of flats. In the first place, its primary object is not one of providing comfortable homes for well-behaved people, but of producing a handsome profit for somebody; of giving a high rate of interest on an initial capital. The profit is for the one who has the enterprise to initiate the scheme, to back it with sufficient capital, to see the work carried through and to run the risk of unsuccessful speculation. This being so, the building of flats must consist of a sufficient number of apartments to bring in an annual rental large enough to cover all expenses and pay interest on the total capital put into the building.

The flats must be sufficiently well-planned and so well arranged as to their modern conveniences that they will attract tenants, not only new ones coming into flats for the first time, but those tenants from other flats who will find the new flats more attractive. In other words, they must be up to the very highest standards of modern design.

The building must also be on the right kind of site. It has to be situated on an important thoroughfare or other desirable position which shows every indication of maintaining its status for some period of years, possibly twenty-five or thirty. Again, the site has to be a suitable shape. Although it may be excellently well situated, its irregular or too lengthy shape may make it impossible for the making of a plan with sufficiently simple systems of stairs and corridors.

Another factor is that the building cannot be expected to have great pretentions architecturally. The floor heights have to be very much the same for each story, which makes for a monotonous appearance: sets back anywhere for the sake of appearance are not feasible as they cause a reduction in the rentable floor space, and the addition of external enrichments, except in a small way, is too expensive.

(To be continued.)

THE REPAIR OF ANCIENT BUILDINGS—XIV

By A. R. POWYS, A.R.I.B.A.

POINTING AND MORTAR JOINTS—(*Continued*).

The practice of darkening mortar to make it "in keeping" with adjoining weathered work is contrary to mediæval practice, and therefore in reality is altogether "out of keeping" with buildings of that tradition. Further, where this is done, though it may give a colour more like that of the old work immediately on completion, in a few years it will be seen to have robbed an old building of its lively brilliancy, for such darkened mortar can never give the variety of light and dark which adds much of the characteristic beauty of an old building. Illustrations are given to show mortar joints both good and bad.

Cleaning and Applied Preservatives.

It has been noticed again and again that those parts of a building which are kept clean by handling or by the rubs of people passing do not decay. From this it may be concluded that regular cleaning is most desirable. Whenever building operations are in progress no opportunity should be missed to clean such parts as may usually be inaccessible or out of sight.

Lime Wash as a Preservative.

An inspection of those buildings where the mediæval practice of limewashing all stonework has been continued until to-day, will show that there no decay has occurred. This practice (now being revived) has been dropped almost everywhere with the exception of old country cottages, farm buildings, and small houses. It is clear, however, from an examination of mediæval stonework, that it was customarily limewashed; when blocked windows are opened, when early moulded stones, found built into later walls, are examined, traces of lime are seldom wanting. The whole of the inside of King's College Chapel still retains much of its limewash. Traces can be seen on the outside of the western towers of Ely. And at Cleeve Abbey, in Somerset, the domestic buildings which have remained more or less ruinous since the dissolution of the monasteries no exposed stonework dressed or rubble is without traces of limewash. Instances need not be multiplied. References to the costs of limewashing are found in mediæval building accounts. It is established that this was the traditional custom. Wherever the custom has prevailed until to-day it can be seen that limewash materially helps to check decay. It is therefore recommended where a preservative is needed that limewash be applied to stonework after surface repair is complete, and with this in view a leaflet recently prepared by Mr. E. E. Lofting, assistant surveyor to Westminster Abbey under Professor Lethaby, is reprinted here. This leaflet was approved by the Society for the Protection of Ancient Buildings.

"The following notes," it is stated, "are written as a description of a limewash which has been found generally successful as a stone preservative. The lime used for making limewash must be stone lime, and not either chalk or gas lime. It must be freshly burnt and in the lump. The particular lime described here, namely Wakeley lime, was chosen on this account, and because it is a light stone colour, and so saves in many cases the need for any colouring ingredients which may reduce the penetrative and preserving qualities of the wash. It is recommended that any question of colour or toning down should be left until after the final coat of limewash, when it can easily be done (if it must be) by rubbing or brushing on a little dry colour or dust. . . .

"It is well to mention, when ordering, that fresh lumps are required as being more fiery for limewash. To mix the smallest quantity, take, for instance, an ordinary iron three-gallon domestic pail. Put a lump or two of the dry lime, weighing 2 lb. (rather less than more) into the pail with a quarter of a pound of crushed common salt, and quarter fill the bucket with boiling water (three quarts). So soon as the water has broken down the lumps, it will boil furiously for about a minute. Add a little more water and give it a good stir—leave it a few minutes to finish slaking—and then fill the bucket with boiling water, making twelve quarts in all. It will be seen that this pailful of limewash ready for use is about as thin as skimmed milk. The use of boiling water for slaking an already fiery lime is to set up an extra heat which produces a more completely dissolved and penetrative wash. If the lime does not boil in the pail, throw it away and try another 2 lb. lump.

"After first brushing down the stonework, apply the limewash with the ordinary grass brush, lightly and patiently rubbing it into the stone. Some stones will absorb a great quantity. It is very important, especially with the first coat, to keep on saturating the stonework with the limewash, carefully working it over and over again into all the interstices. When the first coat is dry, apply a second coat—and then a third. The importance of care in the application cannot be too strongly insisted on; to do it really well requires time, patience, skill and hard work. The stonework should be normally dry—because it is then absorbent; but in very hot weather and in a hot sun it will be found that there is too much evaporation outwards to enable good work to be done.

"A word on the preparation of ancient crumbling stonework for limewashing may be useful. All attempts to fix and solidify loose scaling and sandy deposit in position, as some chemical methods try to do by spraying, seem in the end only to increase the disease; and similarly there does not appear to be much use in spraying limewash on to crumbling stone. But provided the limewash is applied with a brush and sufficiently thin, as above described, it is better to do without any preparation than to risk removing by too much brushing anything that might be saved. The problem is to find out by experiment in each case how far it is really necessary to go in the way of brushing down, because some crumbling surfaces, which work up a kind of lather as the first coat is applied, are quite hard by the time they are dry and ready for the second coat. A good method, after brushing off the surface dust and deposit, is to rub the stonework down gently with the hand or a piece of rag; this generally brings away all that need be removed, and, as far as words are concerned, may, perhaps, be safely laid down as a limit of preparation.

"When all the words have been said about any particular limewash, it must be remembered that it takes some time to become a really good limewasher, and many men cannot be got sufficiently interested to take so simple a thing seriously. But, carefully done, limewash is more than a protective coating on the stone—it is absorbed into and hardens the stone, and cannot be removed. Too much must not be expected from the first application to badly crumbling surfaces, for the scaling may to some extent continue. A second coating after an interval of some years, and even a third, will carry the healing process further every time.

"The effect of the treatment on doing it for the first time, and a large quantity at once, may be thought startling; but experience shows that "toning down" very quickly takes place, and the old textures and irregularities quickly strike through."

But Mr. Warnes, whose valuable book on "Building Stones" has already been referred to, dismisses limewash as unscientific and disfiguring, and other chemists who have studied the question, lean to his opinion, if they do not actually share it. I do not doubt their knowledge, but am puzzled to reconcile it with the facts as they may be seen by ordinary men. Perhaps the word "unscientific" should be taken to mean "chemically unsound." In the face of this I leave it to others to explain why this preservative is in fact effective. I suggest that because limewash closes the open crevices of the surface, as on a larger scale a well-made mortar joint fills the spaces between the stones themselves, it hinders the entry of the moisture which carries the agents of decay to the stone, and so shields it from attack. I advise any who share the chemists' doubts to visit Westminster Abbey and examine the masonry of Henry the Seventh's Chapel or the cloister walls, both newly limewashed, or to go and see the work done by Mr. Wm. Weir at the Guild Chapel at Stratford-on-Avon, or the Church at Henley-in-Arden, and the north and east walls of Christ Church, Newgate Street. There are many other examples up and down the country.

It must be remembered, however, that limewash, like mortar, will only adhere to

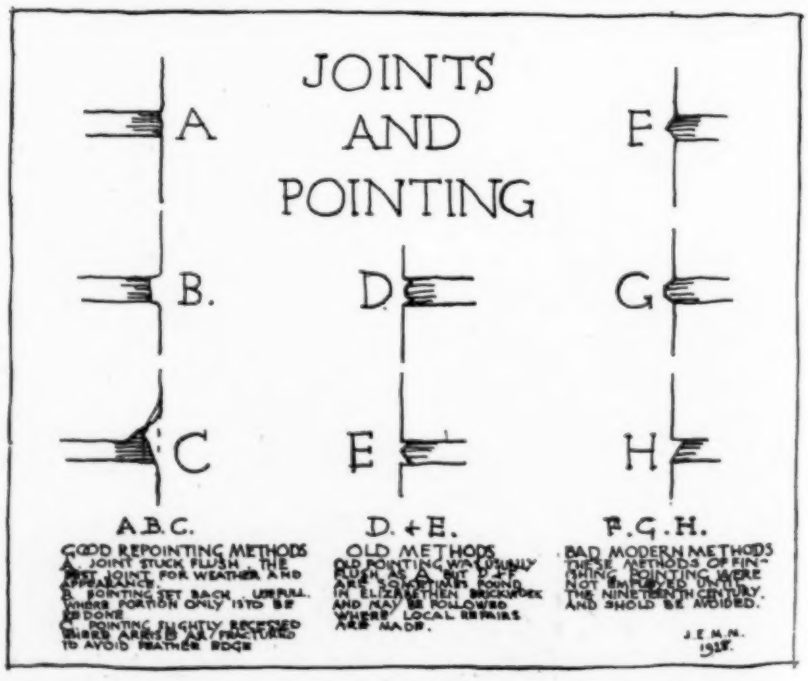

JOINTS AND POINTING
A
B.
C
D
E
F
G
H
A.B.C.
GOOD REPOINTING METHODS
A. JOINT STUCK PLUSH. THE BEST JOINT FOR WEATHER AND APPEARANCE.
B. POINTING SET BACK. USEFUL WHERE PORTION ONLY IS TO BE DONE
C. POINTING SLIGHTLY RECESSED BEDS ARRIS ALL FRACTURED TO AVOID FEATHER EDGE
D. + E.
OLD METHODS
OLD POINTING WAS USUALLY PLUSH AS D & E BUT D & E ARE SOMETIMES FOUND IN ELIZABETHAN BRICKWORK AND MAY BE FOLLOWED WHERE LOCAL REPAIRS ARE MADE.
F.G.H.
BAD MODERN METHODS
THESE METHODS OF FINISHING POINTING WERE NOT EMPLOYED UNTIL THE NINETEENTH CENTURY AND SHOULD BE AVOIDED.
J.E.M.N. 1927.

Fig. 19.

clean stones. This does not of necessity mean that all lichens should be removed before it is applied. The wash is sometimes laid over these growths as well as on other stonework, for where lichens are the stone is sound and needs no protection, and so it does not matter if the wash does peel off there, as it will quickly do. At other times only those stones which are decaying or which show incipient signs of decay are treated.

Mr. Weir's practice differs a little from that recommended in the sheet reprinted above. He does not recommend the addition of salt, and he adds enough water to bring the wash to a very fine consistency indeed. He applies the wash in as many as five or six coats, and even then the surface as he leaves it has so little limewash on it that the coating is thinner than what is usually left after a single application by others, and also than that usually found on mediæval masonry.

Mr. Warnes and some others hold that the change of colour resulting from the limewash is a disadvantage, and this no doubt it sometimes is, and on that account it is not always recommended. Yet in regard to this matter the change from one colour to another can be nothing else than the change from one beauty to another. Besides which the change is only temporary, as the limewash weathers soon if it is not put on thickly. And, further, limewash may be toned if desired, though the lime Mr. Lofting recommends has of itself a fair transparent colour, as though it were lightly stained with ochre and raw umber. It must be remembered also that if limewash is properly applied the texture of a building remains unaltered. Stone walls so treated cannot be mistaken for anything but stone, brickwork clearly shows, and plaster surfaces retain the quality which makes them pleasant.

"THE POST-WAR RASH OF BUNGALOWS"

Mr. Wm. Alban Jones, L.R.I.B.A., opened a discussion on the subject, "That the post-war rash of bungalows and houses now disfiguring the countryside is a reflection upon the architectural profession," before the Leeds and West Yorkshire Architectural Society on March 28. Mr. Wm. Whitehead, A.R.I.B.A., opposed. Mr. Jones, in opening his discussion, said he would endeavour to divide the subject into formal headings as followed:—

1. Did we realise the seriousness of what is happening?
2. Were we agreed upon a remedy?
3. Could architects demonstrate a remedy, and if so, what steps were being taken to proclaim it?

Dealing with the first heading, the lecturer asked whether we were justified in applying the term "rash" to the average house-building development of the past few years? Were we merely æsthetic snobs so wrapped up in our mellowed Georgian or Tudor domestic lineage as to miss altogether more virile qualities that might be inherent in the crude brick and mortar upstarts now asserting themselves?

Sir Reginald Blomfield, a short time ago, was reported to have spoken in praise of English architects as still being pre-eminent in domestic architecture. When the lecturer reflected on what was happening to our countryside he could only infer that "not the Jerry place at Tooting, but a country house with shooting" was all that came within the ken of really distinguished architects. When one thought how infinitesimal was what we termed "good domestic stuff," as compared to the vast bulk of house building in the country, then he submitted that complacency was entirely wrong, especially from an Olympian of Conduit-street. Could it be that we were lulled into a lotus sleep by exhibiting some "precious" bits at the Architecture Club Exhibition, and were only half awake to the seriousness of what was happening outside the ring fence to the countryside?

Were we agreed upon a remedy? The implication behind most articles on that matter in the professional Press was that all would be well if only all the smaller houses were designed by architects instead of speculative builders. Were we justified in this assumption? Within a short 'bus ride of Leeds he could point to a more or less typical new suburban street in which nearly every house had been designed by local architects. The design of each particular house might pass muster, but the *ensemble* was hopelessly discordant. The designs ran through the whole gamut from the semi-stone house of Yorkshire character, through the formal brick Georgian, down to the sham half-timber picturesque, and ended on the "no nonsense" type of pressed brick and gaping windows, with roofs of various pitches of tiles, dull red tiles, bright red tiles, green slates, variegated slates, blue slates, down again to the purple slates. In so far as that street was no isolated example, surely it was a serious reflection on the profession generally. Were we not hopelessly each a law unto himself? Was there any common urge or faith in us?

When a client was insisting on having put up incongruous materials on an estate already partly built, did any architects think of whisking him off for half-an-hour's motor run in the suburbs and attempt to convince him by visible proof of the hotch-potch that sort of thing had resulted in on other estates?

Short of a truly impelling modern style in which we should all feel the urge to follow, could we discuss the possibility of dividing up different portions of estates and arrange within these areas to keep to some agreed style and materials? Even "Georgian Crescent" next to "Tudor Avenue" would be better than the perky gable and leaded lights of "The Homestead" being frigidly put out of countenance by the classic symmetry of a next-door highbrow neighbour. If some such agreement was developed, our new ring roads might have at intervals varied groups of houses, each hamlet having a distinctive note in which at any rate the cluster and colours of the roofs would pleasantly mingle instead of the discordant straggling building development now putting a blight on these fine roads.

No student should run away with the idea that the abstract principles he was imbibing at school would render the rash we were considering easy of avoidance. The proposer defied them to design a satisfactory pair of semi-detached houses without committing the grievous sin of duality in the elevations.

Could architects demonstrate a remedy, and if so, what steps were being taken to proclaim it?

He did not think architects were pulling their weight in preventing uglification of the countryside. It did no good shrugging their shoulders and saying that they were not consulted and therefore they were not responsible. They should not stand by idly in the market-place because their labour was not hired. Sir Berkeley Moynahan, on behalf of the surgeons, did not hesitate to proclaim from the house-tops the need for combating the scourge of cancer, nor Sir Arbuthnot Lane on the folly of too much bacon and eggs for breakfast. They boldly risked the displeasure, nay, even the terrible accusations of advertising from the more correct professional diehards. The proposer would welcome anyone who could use the eloquence of Sir Berkeley in relation to that architectural matter and stir up the public bodies to a forceful realisation. We had an efficient technical Press which broadcast within our ranks every week splendid illustrations of current architecture coupled with very able articles on that very matter, but they were for ever preaching to the converted. In that respect they were akin to the discussions in that room. Some means were wanted for boldly proclaiming to the public any remedies we might have. When one saw the keenly interested crowds who flocked annually to see "ideal homes" at Olympia, one rather chafed at professional etiquette that forbade undue participation in hurly-burlies of that sort. It would indeed require the courage of a Bernard Shaw to advocate the R.I.B.A. flaunting its message from a stand at Olympia. It was a touch, however, of his genius that prompted the Exhibition there this year of an excellent series of photographs of Modernistic Architecture. These were artfully arranged alongside the slow-moving queue awaiting admission to the House of the Future. It much relieved the tedium of waiting crowds and prepared them for the worst when they eventually got inside.

Mere lamentation or preaching would not do; *nobody listened nowadays, but everybody looked.* American psychologists reported that 85 per cent. of all knowledge gained comes through the eyes, as against 11 per cent. through the ears. Our crusade, if we had one, could be helped more by pictorial means than by the spoken or written word. The public were floundering and wanted guidance—they were ready to react to any effective suggestions—even the char-a-banc parties were leaving the new main roads and turning down the old by-roads searching for something other than mere speed and utility. Whose job was it to afford positive guidance in this matter if not the architects?

In conclusion, he would say that architects were not pulling their weight in the matter, and it was a reflection on the profession that they were not so doing.

Mr. Wm. Whitehead, A.R.I.B.A., in opposing the question, said that the opener asked them to be on his affirmative side so that at least they might shrive themselves by open confession. If by that he meant them to admit that "we are miserable offenders and there is no health in us," he—the opposer—strongly advised them to do nothing of the sort. The inference of the public from any such confession would be that architects were the principal offenders, *and that simply was not true.* Whoever else was to blame, it was certainly not the architects, and he thought Mr. Jones was much nearer the mark in his presidential address to this Society in 1924. "Tired as we may be of the subject, it remains the most important issue to the State in which architects should be concerned, and it is in the reaction from the extravagance of the Addison Act that the chief danger lies of an ugly countryside."

"It is obviously unwise for either architects or the public to draw their experience entirely from the abnormal times. Let anyone view a normal pre-war Leeds development, say, round Dewsbury-road, then transplant him quickly to Earswick, near York, and let him contrast the two—the architects at Earswick and the non-architects at Dewsbury-road, *both of similar rents and costs*—and I do not think there would be much hesitation in deciding that architects are no mere middlemen, but have a distinct function, both æsthetic and economic, in housing."

"'So great is the gnawing hunger of the nation for houses that it has lost all niceties in its appetite. If cast-iron houses for Robots prove an economic proposition, æsthetic objections are of no avail. The acid test is cost, and our convincing arguments must be on the economic side. We must strive to prove that architects can function as savers of the public purse rather than spenders. The less funds at disposal, the more need for a skilled architect. Perhaps one argument that tells is the fact that such pioneers in providing economic houses as Rowntrees, Cadburys, Dorman Longs, Pilkingtons, and other very efficient business firms have found from experience that it is wise to pay for the best brains, instead of engaging mere "plan drawers" or crude architectural assistants, as many local authorities are now doing. We all know of schemes carried out under such substitutes that would make the angels weep, whilst the courts may shortly bring to light the folly of entrusting the direction of large sums of public money to such unqualified persons. I know

of definite cases where by skilled evolution of plans and management the final housing accounts have proved architects to have saved local authorities many thousands of pounds, which quite outbalanced the architectural fees."

The opposer believed those statements made by Mr. Jones in 1924 still held good in 1928. Would he explain why the architects he commended yesterday were the culprits of to-day? Who was responsible? The direct responsibility for building was covered by three heads —the State, the speculative builder, and the private individual—and he would endeavour to trace the association of the architect with each; by that means they would discover whether he was or was not responsible for the "rash." Under the heading of the State were included municipalities and corporate bodies, garden city companies, etc.

Architects figured largely in the Addison Scheme, and the bulk of the houses erected were from their designs In spite of a vast amount of criticism levelled at the time, the opposer submitted that architects acquitted themselves worthily; the difficulties in regard to labour and material were without precedent, and everything had to give way to the question of cost. A tremendous amount of useful work was done during that period in the development of housing, compact and simple planning became a necessary fine art. Experimental work with materials and different types of construction were tried in the genuine endeavour to find a solution of the problem of producing satisfactory houses speedily. Every description of material was used, including timber, slate, asbestos, papier maché, cement and concrete in many forms, and even mud or *pisé de terre*; but the outcome of it all only proved the old-fashioned materials, brick or stone, timber, plaster and slates or tiles could not be beaten either for cost or appearance. From the æsthetic point of view, with which we were chiefly concerned, notwithstanding all the difficulties and restrictions at this period, there were many examples throughout the country and in Leeds which might be quoted as models for successful housing in regard to lay-out, planning and general design.

Municipal housing had continued from these early days of trial and tribulation and still went on, generally under the direction of official staffs. This he considered unfortunate and unjust as the public lost the result of all the experience gained by the architects in the early days of mass production, and it was hardly fair after doing all the spade work that others should step in and reap the benefit. Good work was being produced in many instances, but there were many more instances of unenlightened public bodies engaging very inferior staffs and turning out the trash which constituted the "rash" in question.

The speculative builder was the next classification; he had always been with us, and had, no doubt, served his purpose well, having produced houses and made money for himself. He might be classified as good, bad, and indifferent, but in these enlightened days he had not always been slow to recognise the usefulness of the architects' services, and had benefited to the extent of good planning and lay-out. He continued to deal with the exteriors according to his own fancy on what he considered good selling lines, spar roughcast, or pressed bricks, large panes of glass with coloured flowery leaded lights over, heavily moulded front doors with bull's-eye glazed top panels, all refinements internally, such as electric plugs, flush switches, stamped finger-plates and door furniture got up as antique silver, bronze or brass, deep skirtings, picture moulds and cornices, and all the finishings that delight the purchaser's eye and make him forget such things as foundations, drains, bricks, timber, plumbing, etc., incorporated in the fabric which had been put together in the quickest possible manner with the cheapest possible material obtainable.

Dealing with the private individual or client, the opposer said that type was legion, but when boiled down, how often its requirements were the same. They knew exactly what they wanted — usually a £2,000 house for £1,000—they produced the plan all carefully dimensioned irrespective of coincidence, and fit the stair and other oddments into spare corners or spaces left over. The main ideas of luxury were those previously reeled off to them by the speculative builders on the many sites they have visited before coming to an architect, who, being a superman, could do all the impossible things the builder could not. Architecture, maintained the opposer, was a Cinderella among the professions, and altogether too modest in its claim; architects' advice was too often ignored. There was ability sufficient and to spare within their ranks vastly to improve modern building developments if only intelligent and sympathetic patrons would but respond to their opinions. British architects still led the world in domestic architecture, from the cottage upwards, and could point to Earswick, Bourneville, Hampstead, and Welwyn as visible proof that under intelligent patronage their art could be successfully practised well within the necessary economic limits. Intelligent patronage was necessary to the practice of any art or science, and it required a Pericles as well as architects to build Athens. *Much that was happening on our countryside to-day would be as much deplored to-morrow as were the Victorian slums of yesterday.* The faults in both were alike due to the lack of imagination and foresight. With regard to the remedy, it was difficult, and mainly depended on the demands of an enlightened public. The Englishman's home was still his castle, and it was a far cry to the day when he would be made to build it in conformity with his neighbours. It would appear fairly obvious and would be acknowledged that the chief offenders were the speculative builders, and we should be thankful that the element of cost had deprived them of much of the "liveliness" indulged in during pre-war days. It was suggested that one remedy for the "rash" was for architects to get into touch with those responsible for the disfigurement of the countryside which was making itself felt so acutely; to make some sacrifice and approach the speculative builder with gifts in our hands; and persuade him by the (to him) most effective argument that it would be a paying proposition to place, at any rate, the preparation of his designs in the hands of a qualified architect. In conclusion, the opposer said that architects had been showing the public what they could have in the way of homes. Never before had the public been provided with such ample opportunities of discriminating between good and bad domestic architecture. It was, therefore, his opinion that architects, if charged with responsibility for the disfigurement of the countryside, could with confidence plead "not guilty."

ILLUSTRATIONS

Plan of Building Exhibition, Olympia.

We include in our issue this week a plan of the Building Trades Exhibition at Olympia, which, in addition to showing the arrangement of stands, contains a complete list of exhibitors.

The New Lloyd's.

We published in our last issue a number of reproductions of drawings of this fine building, together with a special article, giving the names of artists and firms associated with the work. We now give a series of photographs of some of the many fine interiors.

Sir Edwin Cooper is the architect.

Shop Front at Cambridge.

This small bronze shop front has been recently carried out at Cambridge from the designs of Mr. Kenneth M. B. Cross, M.A. (Messrs. A. W. S. and K. M. B. Cross, architects).

Malden Housing Scheme.

The Maldens and Coombe Urban District Council have recently completed a housing scheme on land acquired from the Kingston Guardians, formerly known as Norbiton Common Farm. The first scheme of 70 flats not having met the demand for houses, the Council through its Housing Committee decided to erect a further 76 flats, and instructed their engineer and surveyor, Mr. R. H. Jeffes, A.M.I.C.E., to prepare the scheme. The carriageway of the roads has been formed of reinforced concrete 6 in. thick, the reinforcement being supplied by Messrs. B. and T. "Twisteel" Reinforcement, Ltd., whilst the footpaths on both sides are paved with 2 in. artificial stone.

The flats are arranged in blocks of four, six, and eight, and are of four types, so designed as to obtain the best results, both for accommodation and architectural effect. They comprise 32 three-bedroom and 44 two-bedroom flats, and each flat has a good-sized living-room and scullery and separate bathroom. All staircases are of precast concrete supplied by the Croft Granite, Brick and Concrete Co., Ltd., and the floors between the ground and upper stories are constructed with 5 in. thick reinforced concrete, the reinforcement also being supplied by Messrs. B. and T. "Twisteel" Reinforcement, Ltd. Hot water is laid on separately to each flat, the boiler being placed behind the kitchen range. The flats are lighted by electric light. All floors, except the staircase lobbies and landings (which are of granolithic) are laid with ½ in. "Terrano" flooring by the Terrano Co. The roofs are covered with Broseley tiles. The walls are of brick 9 in. thick.

Messrs. W. H. Gaze and Sons, Ltd., of Kingston-on-Thames, were the builders, the contract being for £36,373, or just under £478 per flat, including drains, paths, and fences, but excluding the cost of land. The roads and sewers were carried out by Messrs. E. J. Harris and Co., Ltd., of Paddington.

The flats are let at the following rents, excluding rates, etc.:—Three-bedroom flats, 11s. per week; two-bedroom flats, 9s. per week; two-bedroom flats, with separate entrance, 9s. 6d. per week.

Mr. T. Wilson acted as clerk of works.

CORRESPONDENCE

[While we are glad to publish letters on professional and other matters of interest to our readers, it must be understood that we do not necessarily endorse the remarks of correspondents, who will oblige us if they will express their views as briefly as possible.]

Cost of Architectural Partnership.

Sir,—I notice in a recent issue of the "Lancet" that the cost of a medical partnership is generally one year's purchase, whereas I have noted from the advertisement columns of the technical Press that the cost of an architectural partnership is as much as five years' purchase. Why should this be?

A medical partnership is usually highly remunerative and well secured, owing to the basis of income being from a panel. The income from an architectural partnership is very much less regular and secure, and yet one is asked to pay up to five times what a doctor does in a partnership. I should like to see an editorial note on this.

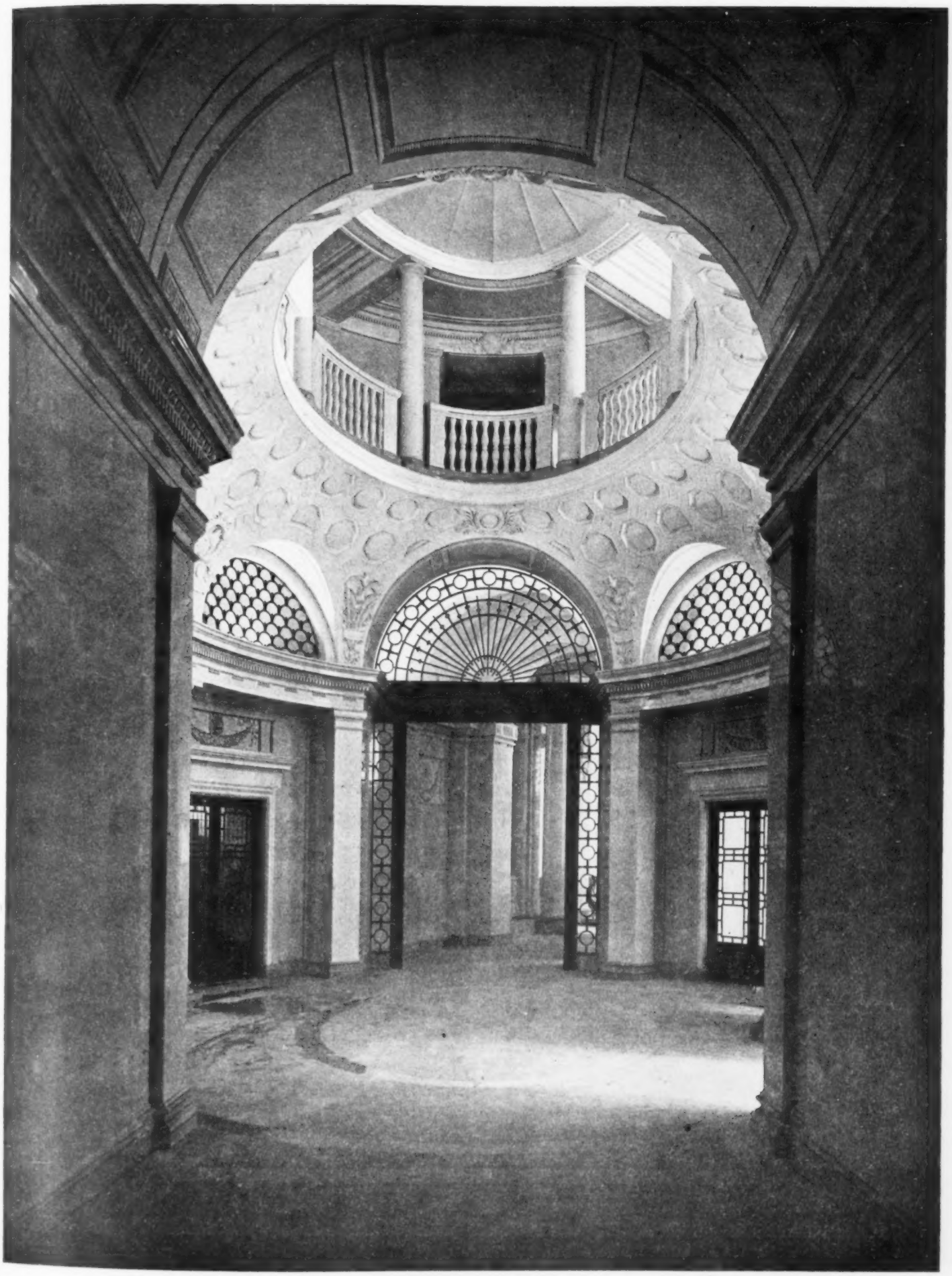
[See p. 562.]

"F. M. S. A."

What is Art?

Sir,—Man can scan the horizon of "art," and this is all he is able to do; but by doing so he is rewarded with a glimpse of the beautiful. "Art" is infinite!

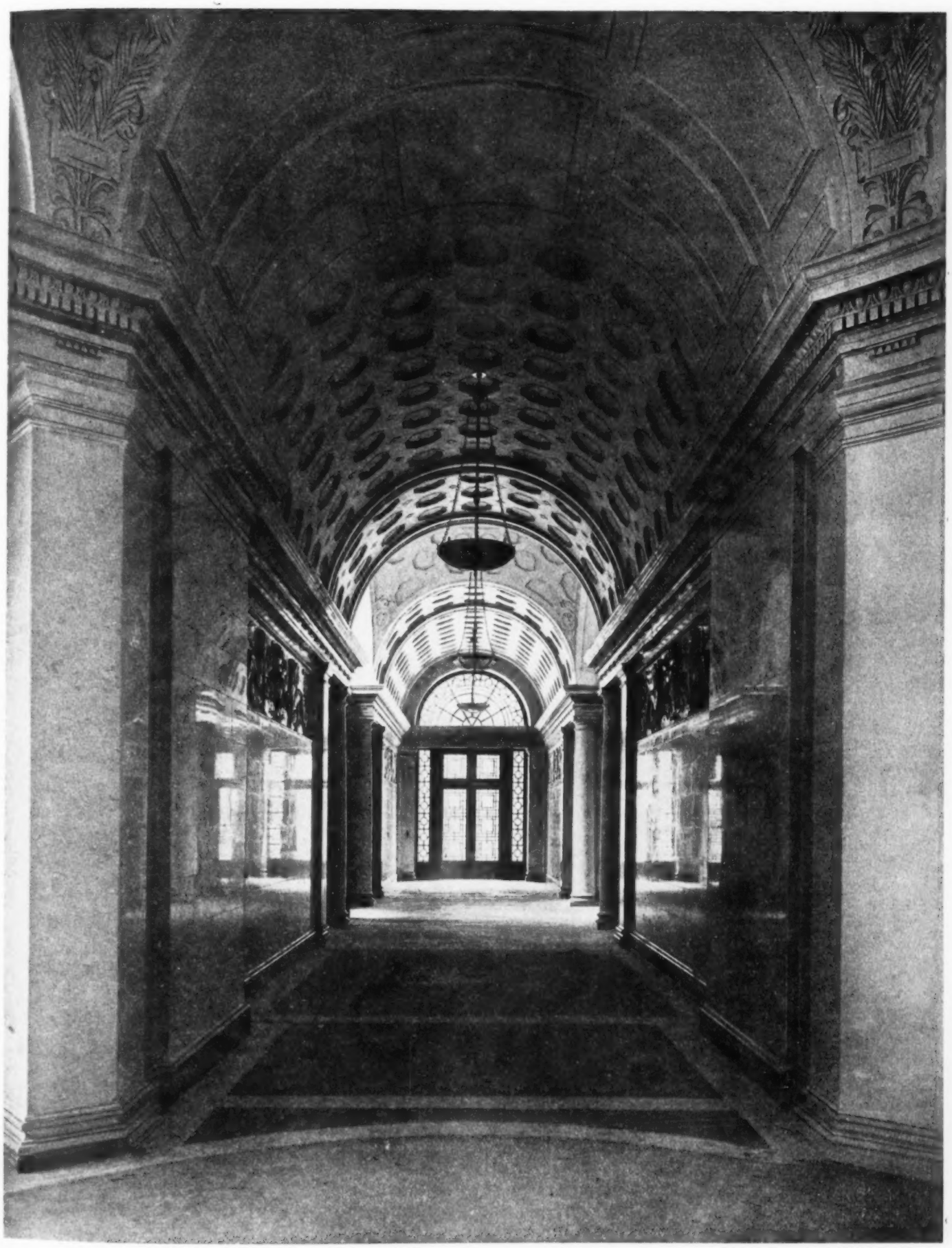
Andrew South.



Lloyds, Leadenhall Street, E.C.: Elliptical Vestibule.

SIR EDWIN COOPER, Architect.

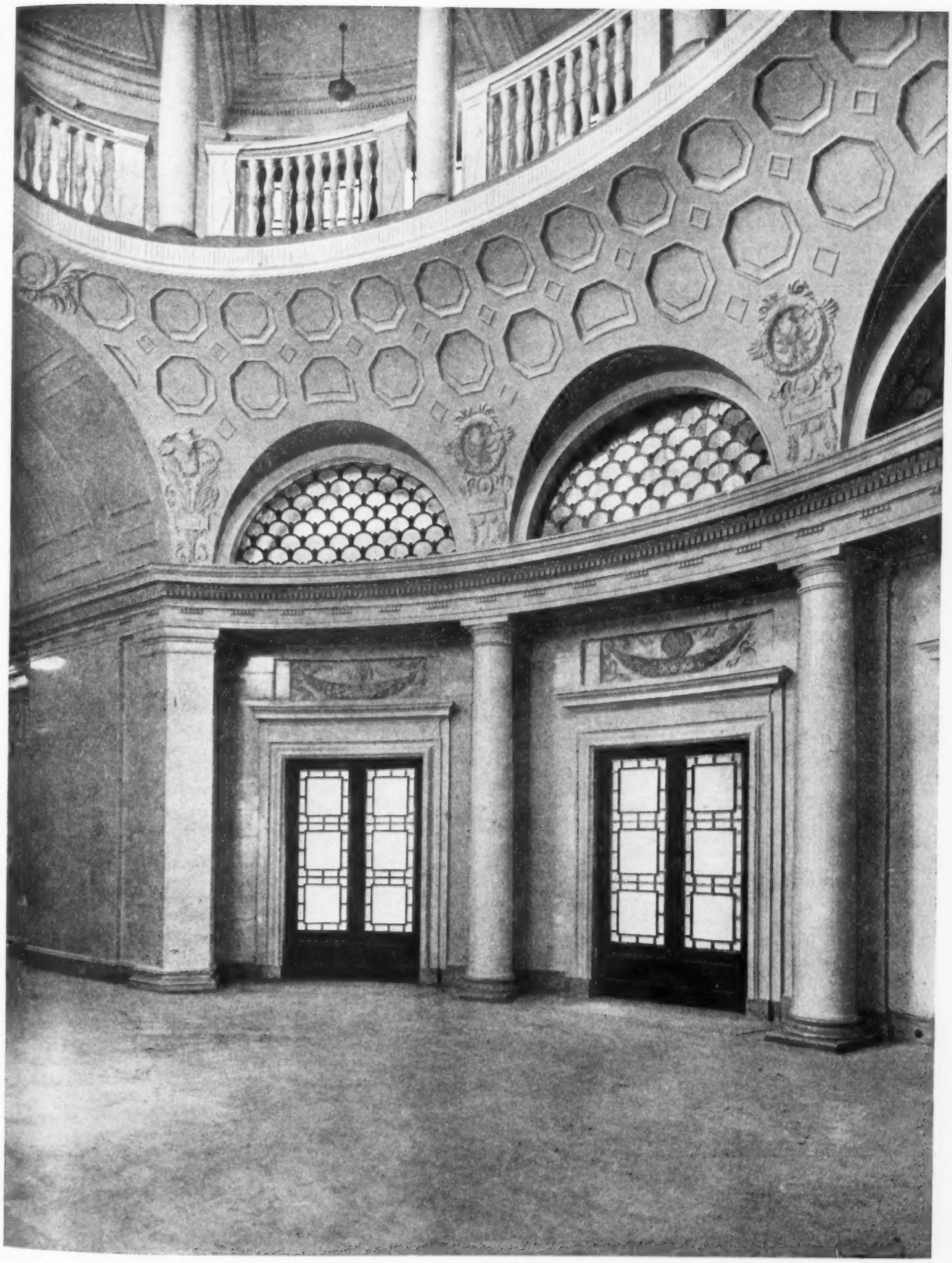
UNIV. OF WISC.



Lloyds, Leadenhall Street, E.C.: Corridor.

SIR EDWIN COOPER, Architect.

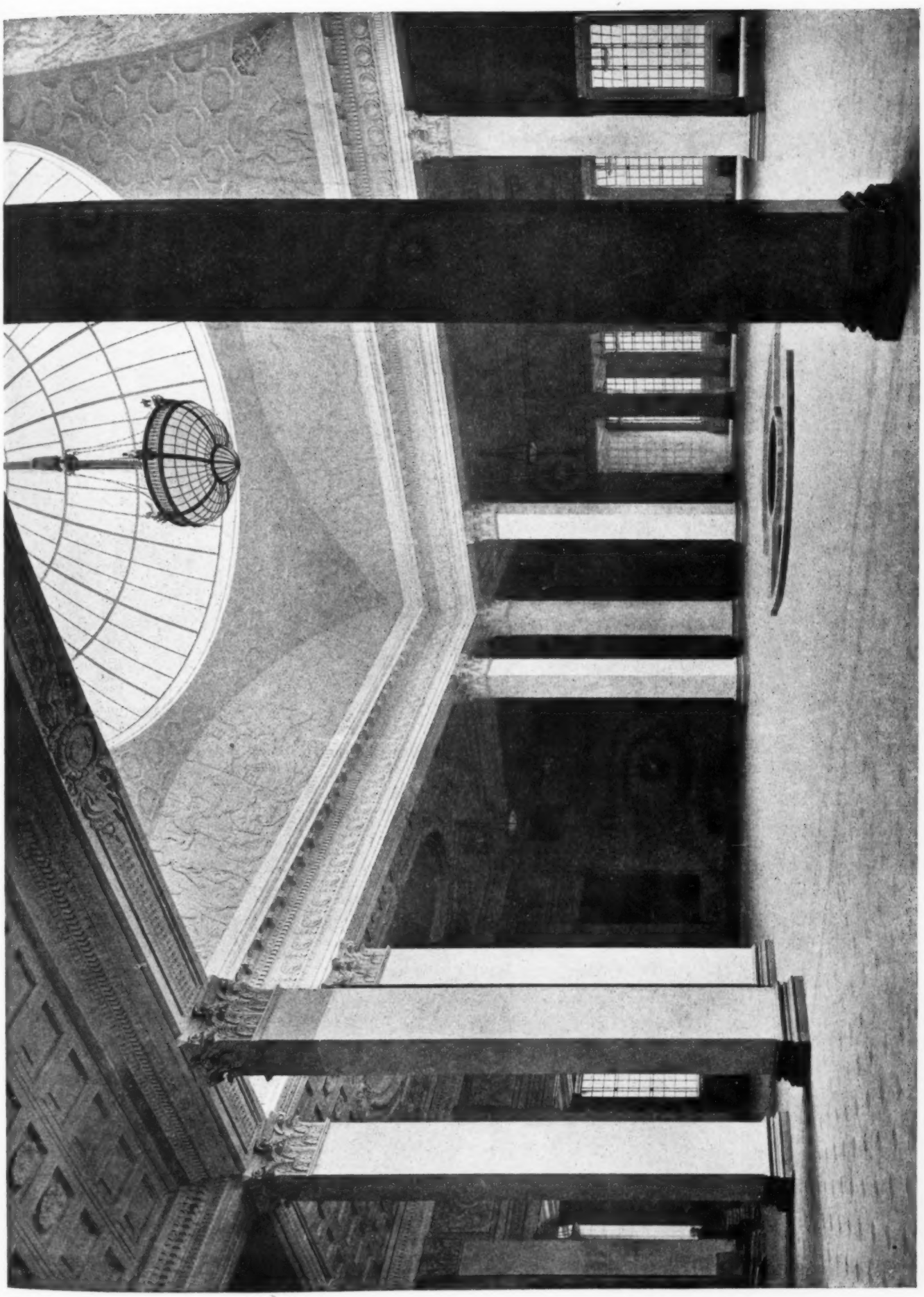
UNIV
OF
MICH



Lloyds, Leadenhall Street, E.C.: Alcove of Elliptical Vestibule.

SIR EDWIN COOPER, Architect.

UNIV. OF MICH.

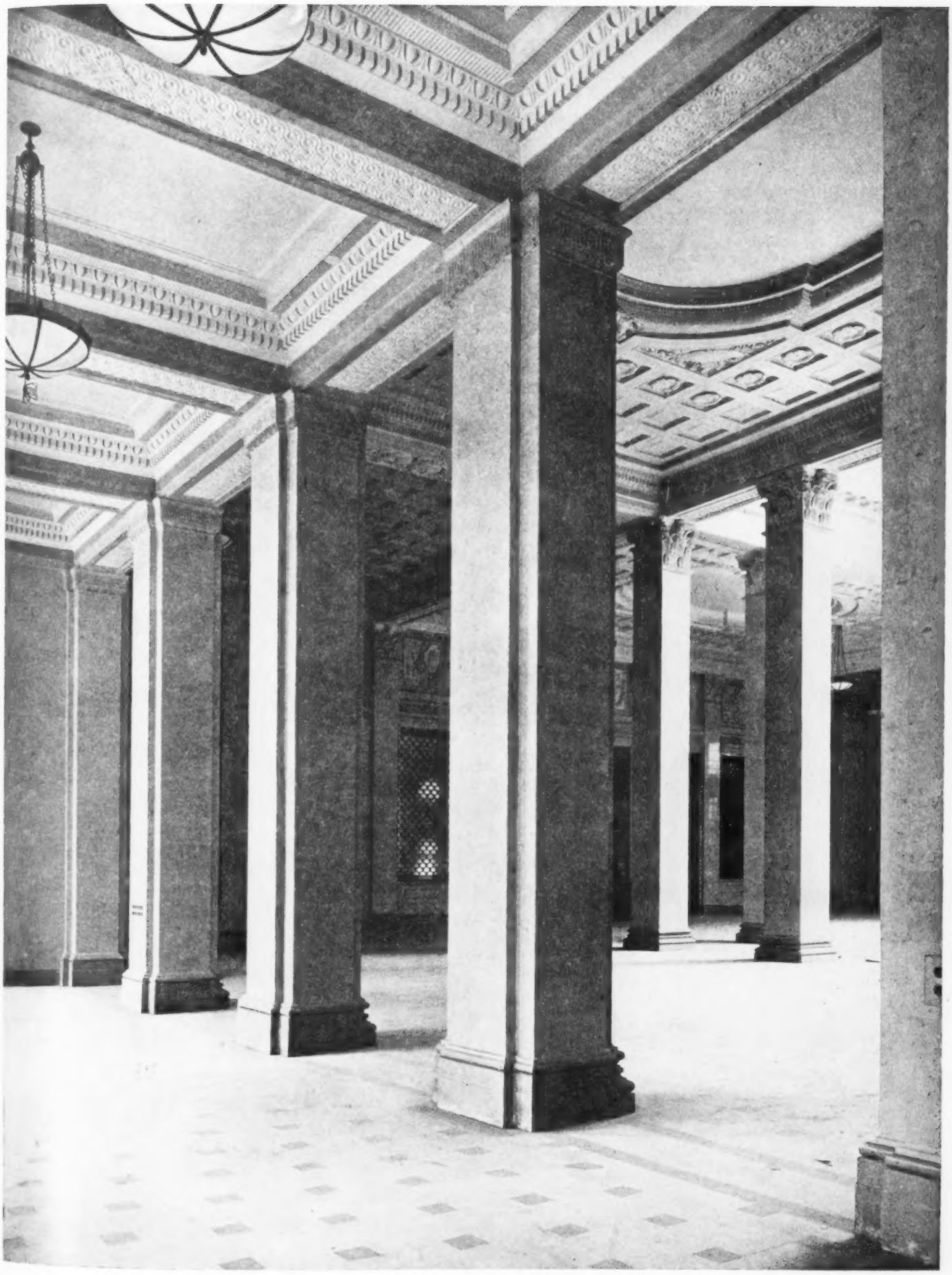


Lloyds, Leadenhall Street, E.C.: "The Room."

(NOTE: The Rostrum, which will stand in the centre of "The Room," is not shown in this photograph.)

SIR EDWIN COOPER, Architect.

UNIV. OF MICH.



Lloyds, Leadenhall Street, E.C.: Detail of "The Room."

SIR EDWIN COOPER, Architect.

UNIV. OF MICH.

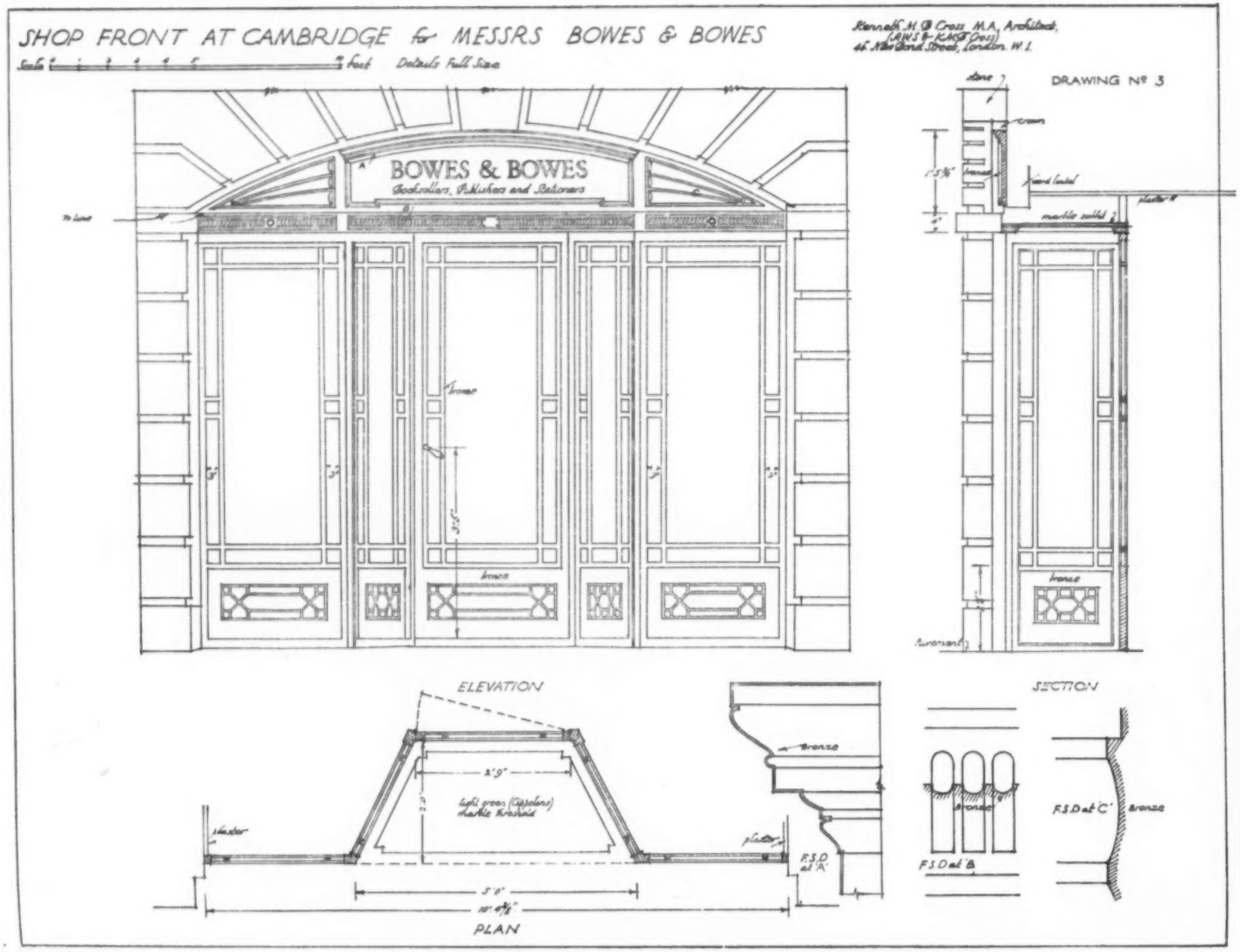
Lloyds, Leadenhall Street, E.C.: Detail of "The Room."

SIR EDWIN COOPER, Architect.

UNIV. OF MICH.

Lloyds, Leadenhall Street, E.C.: Committee Room.

SIR EDWIN COOPER, Architect.


SHOP FRONT AT CAMBRIDGE for MESSRS BOWES & BOWES
Kenneth M. B. Cross M.A. Architect, (A.R.I.B.A. - K.M.B. Cross) 46 New Bond Street, London. W.1.
Scale 0 1 2 3 4 5 Feet Details Full Size
DRAWING Nº 3
BOWES & BOWES
Booksellers, Publishers and Stationers
bronze
ELEVATION
SECTION
PLAN
F.S.D. at 'A'
F.S.D at 'B'
F.S.D at 'C'
Light green (Cipolino) Marble Riveted
plaster
marble veiled

Shop Front at Cambridge.

MR. KENNETH M. B. CROSS, M.A., Architect

DRAWING NO 1

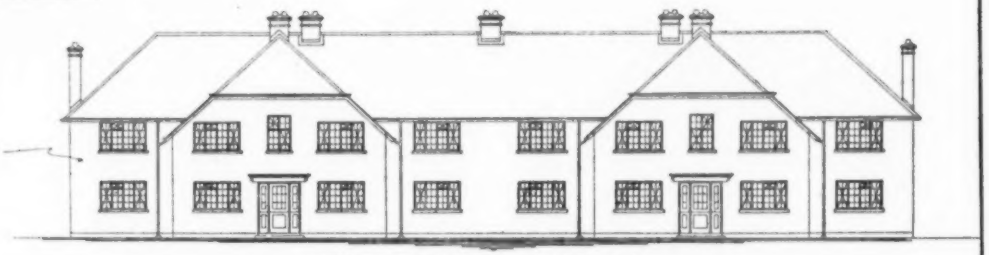
THE MALDENS & COOMBE URBAN DISTRICT COUNCIL.

THORNE ROAD FLATS SCHEME TYPES A1, & A2.

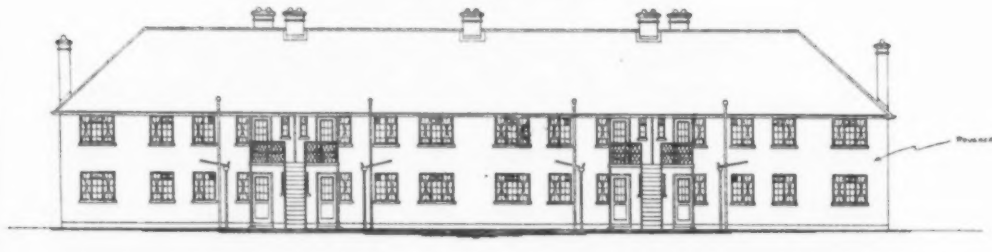
HOUSING ACT 1924.

SCALE — 8 FEET TO ONE INCH

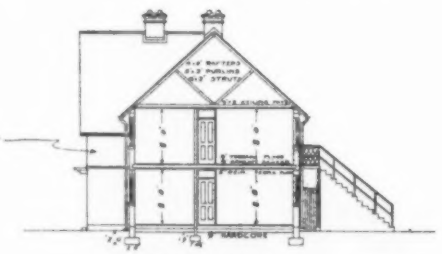
FRONT ELEVATION TYPE A1.



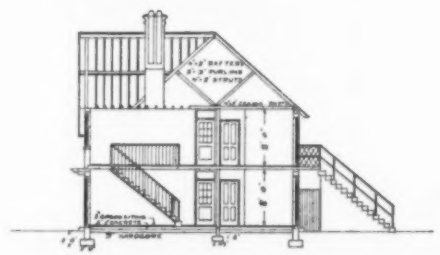
FRONT ELEVATION TYPE A.2.



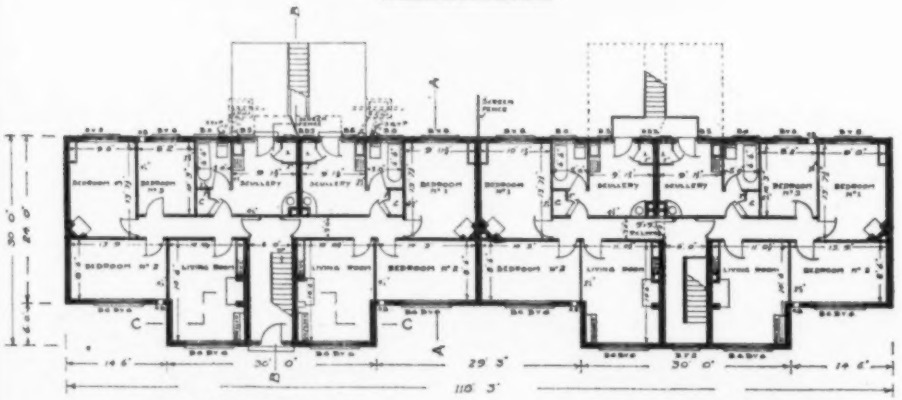
REAR ELEVATION



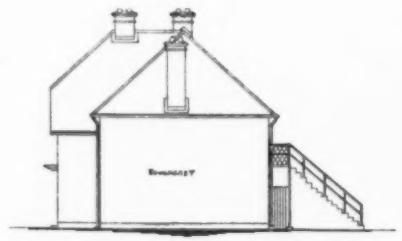
SECTION A-A



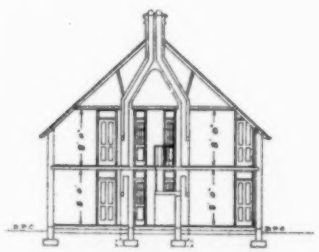
SECTION B-B



GROUND FLOOR PLAN FIRST FLOOR PLAN



END ELEVATION TYPE A.2



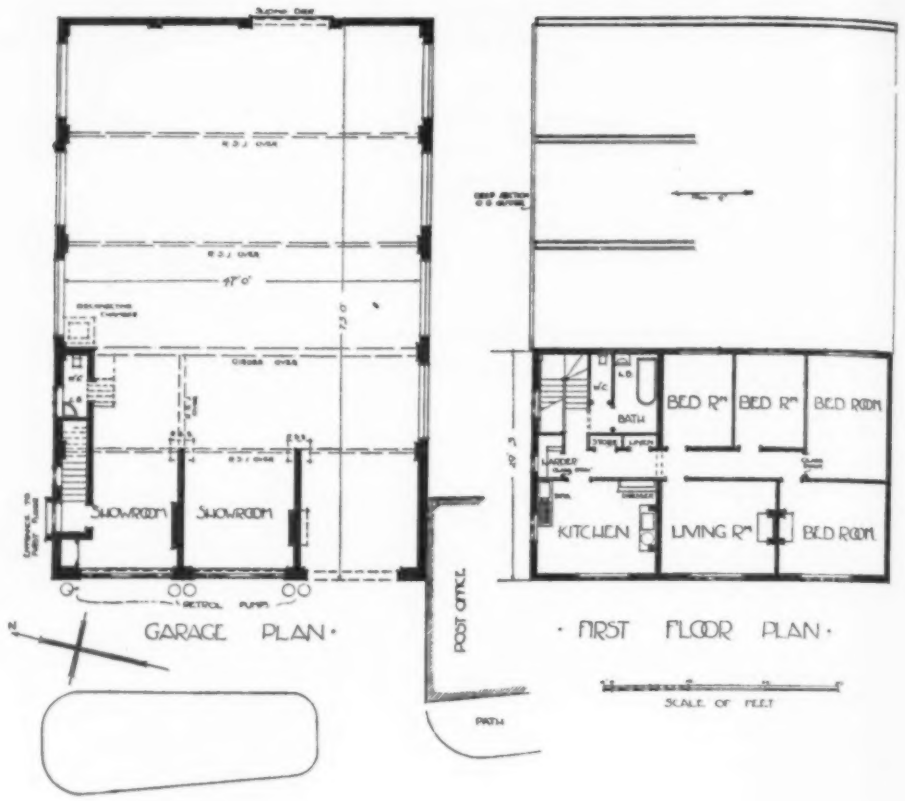
SECTION C-C

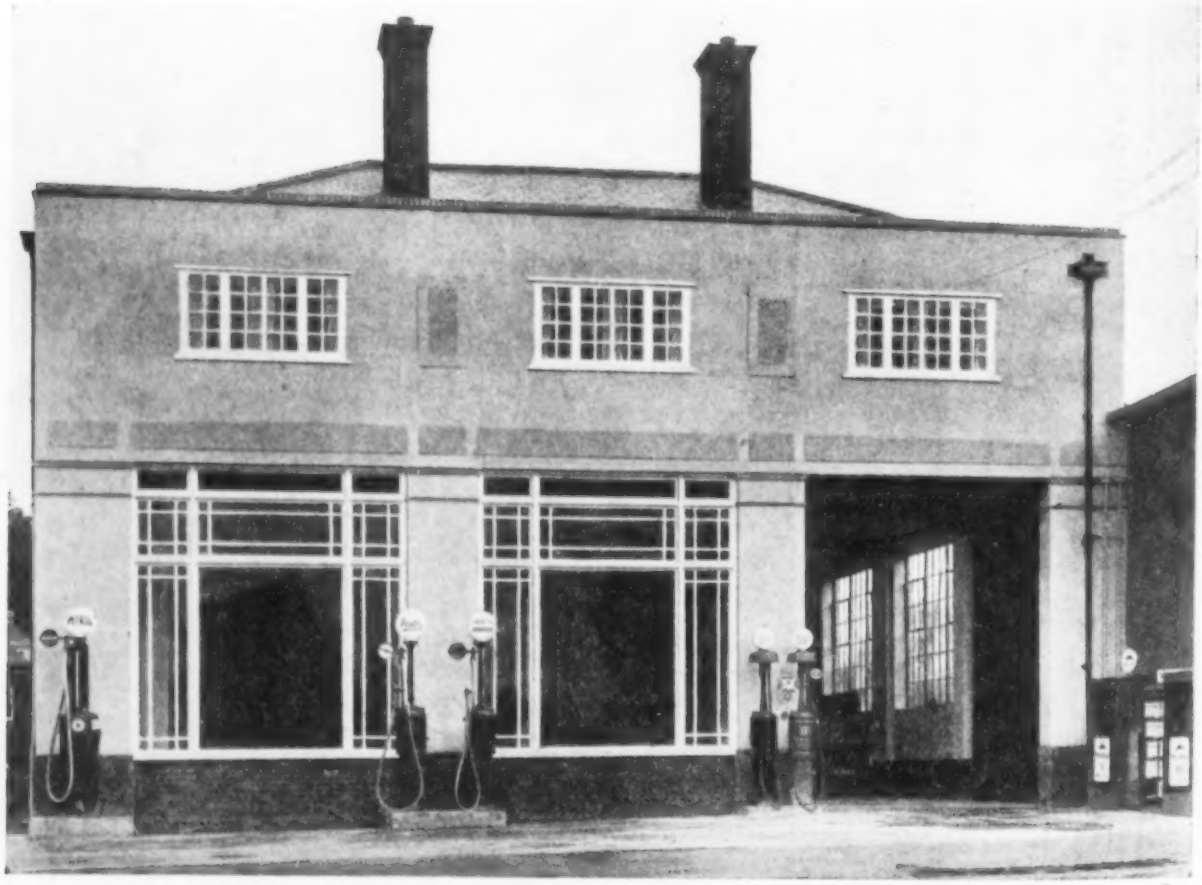
Mr. R. H. Jeffes, A.M.Inst.C.E., Architect to the Scheme.

GARAGE AT HADLEY GREEN, NEAR BARNET.

The garage illustrated on this page has been erected at Hadley Green, near Barnet, for Mr. W. H. Green, from the designs of Messrs. Harold Bailey and Guilford Dudley, F. and L.R.I.B.A.. The architectural treatment is simple and appropriate to the purpose, large windows on the ground floor affording ample light to the showrooms, and four-light casements expressing the domestic accommodation provided in the upper story. On the ground floor the height of the garage is 15 ft. 6 in. to take covered-top omnibuses. The first floor consists of a dwelling flat with an entrance from the side of the building, and a second door leading into the garage.

The general contractors were Messrs. Hicks and Reid, of Little Heath, Potters Bar, and the sub-contractors were as follows :—Field and Palmer, Ltd., asphalt; Comyn Ching and Co., ironmongery; Thomas Elsley, Ltd., rainwater heads; Crittall, Ltd., metal windows to garage; P. C. Henderson, Ltd., sliding door gear; the Woco Door Co., internal doors.





Garage at Hadley Green, near Barnet.

MESSRS. HAROLD BAILEY AND GUILFORD DUDLEY, F. AND L.R.I.B.A., Architects.

MODERN COTTAGE CONSTRUCTION

The second lecture at the College of Estate Management on this subject was delivered recently by Mr. T. Alwyn Lloyd, F.R.I.B.A. Speaking on "Old and New Methods," the lecturer said that, generally speaking, it could be quite definitely stated that the most satisfactory methods of cottage construction were those based on and following from traditional methods. In spite of all that had been adduced to the contrary, in most parts of the country brickwork, with timber floors, and roofs covered with slates or tiles, were still the most economical and suitable building media. In the years after the war, and to a less extent even at the present time, all sorts of alternative methods of construction had been put forward, and their inventors or exploiters had claimed that they had solved the problem of cheap building. There had been innumerable systems advertised for concrete walling, either of pre-cast blocks or material worked *in situ*, asbestos sheeting, steel framing, timber construction *pisé-de-terre*, hollow bricks, etc. Some of these served their purpose in districts where the cost of bricks was prohibitive, or, as sometimes happened, were unobtainable. An enormous number of cottages had to be erected at a time during the years 1919-1922 when there was a great shortage of labour and materials, and to that extent the improvisation of new or alternative methods of construction was reasonable enough. Their employment certainly did something to regularise the prices of bricks, and, more important still, the main intention of these alternative methods being to reduce the amount of skilled work, they helped materially to reduce what would otherwise have been a task far beyond the resources of the bricklayers and plasterers then available.

The lecturer said that he had not had personal experience of steel houses, but after making fairly full inquiries he believed that both as regards cost, maintenance, and the convenience of tenants, they were not a feasible proposition for permanent buildings in such a climate and on such sites as those met with in Great Britain. He had had personal experience of concrete walling of several kinds, and had found it to be on the whole satisfactory, though not cheaper nor better than brick construction. Very good effects could be obtained with self-faced blocks, and he thought that we had not yet got down to the best way of finishing such buildings. It was in practice not easy, in exposed sites, where high winds and driving rains were to be expected, to make a building watertight unless the concrete blocks were covered with roughcast. It was generally over the window and door heads that the trouble occurred, however careful one was.

Another system of which he had had experience in two cases consisted of concrete rammed between specially prepared steel shuttering with a continuous cavity. The wall consisted of an outer 3 in. thickness of gravel concrete, an inner 3 in. thickness of clinker concrete, with a 2 in. continuous cavity in between. The walling was covered externally with a rough cement rendering, and internally concrete from the shuttering was merely covered with a skimming coat of plaster roughy brushed on. The concrete walling in itself eliminated the use of bricklayers, and the method adopted for rough plastering inside, which could be done by unskilled or semi-skilled men, eliminated the plasterers. In this and other systems of concrete walling where plasterers' work was eliminated, asbestos slabs or composition boards were used for the ceilings, the joints being covered with wood strips. Special concrete construction often entailed the use of standardised plans, which was obviously a great disadvantage, as each plan has to be carefully considered in relation to site levels and aspect. It would be found in most parts of the country that brickwork was the cheapest and best form of walling for cottages. The price of common bricks and of facings varied considerably in different parts of the country, but even so, the general position as to the economy of brickwork remained the same. On sites not subject to the great exposure from sea or wind and rain, 9 in. brickwork, so long as it is covered with roughcast, could be used for external walling.

As regards facings, in the London district, in the Home Counties and the south of England, beautiful bricks—hand-made, sand-faced, and multi-coloured in shade—were easily obtainable. There was no more satisfactory walling for cottages than those facings, provided one used a wide light mortar joint. Black joints, pointing of the conventional kind, only had the effect of spoiling the texture and general attraction of the facings. He did not require to say that where facings were used the walls should always be 11 in. hollow. Common bricks should never be attempted as facings; apart from the nasty pink appearance, they were subject to damage from frost and rain, and in a very few years the face might start to peel off.

With regard to chimneys, while red sand-faced or multi-coloured bricks were quite satisfactory on tile roofs, neither they nor the more conventional red pressed bricks looked right in a slate roof. Chimneys of blue or brindled bricks were much better with slates, but again the joints should be in light mortar. The best position for chimneys was on the ridge and not at the ends of buildings, where, owing to the V-shaped recesses formed by the hipped ends, the chimneys were more likely to smoke than if they were on the main roof. Footings were not necessary for cottage foundations if the concrete was made double the width of wall.

The dampcourse was a very crucial matter, and most of the dampness in old houses was due to the absence of a dampcourse. The best position for it was above the ground and halfway across thickness of ground floor. It should be either of slates in cement, bitumen on a canvas foundation, or, better still, having a lead core. A slate dampcourse was by far the best for cottages, as there was not sufficient weight in them to crack the slates, which was sometimes claimed as a disadvantage for this dampcourse in heavy buildings. Another very important point to remember was to put a dampcourse over concrete lintols in hollow walls, tucked into the joints of brickwork.

Lintols should always be constructed of concrete, reinforced except to a very narrow opening with steel rods.

The roof plan should be kept as simple and straightforward as possible; dormers, jumps, and breaks in roofs were to be avoided, which applied also to back projections in cottage blocks.

It was not necessary in cottage construction to provide roof principals or heavy timbers. Common rafters, spaced about 12 in. apart, not less than 4 in. by 2 in. size for the average roof (though this could be reduced to 3 in. by 2 in. for short lengths and flat pitches were used. The rafters were stiffened at the foot by a wall plate, at the head by the ridge piece, and in between these two points they were stiffened by purlins.

The eaves was a member in the roof to which much attention should be given. It should be made simple, and sprockets, tilting fillets, and so on, were not really necessary. The best form of eaves construction was a projecting soffit covered either with plaster or boarding, the fascia not being too deep. This cost less and looked better than exposed rafter feet.

If flat tiles were used for the roof, the hand-made, sand-faced type were much better than machine-made, both from the point of view of appearance and wearing qualities. Specially made hip tiles looked better than the half-round, though they were certainly more expensive. If slates were used, the large sizes should not be specified. 14 in. by 7 in. or 16 in. by 8 in. seconds, which were thicker than the first quality, were good sizes, and their proportion fitted much better into the design of a cottage than a 24 in. by 12 in. or 20 in. by 10 in., which a speculative builder so often used. On exposed sites the lecturer always specified a 4 in. lap for slates, though 3½ in. was good enough for an ordinary urban site.

Where gables were adopted, it should be seen that the verges were finished with a projecting undercloak formed of slates or tiles laid flat up the rake of gable. The usual builder's method of simply finishing the verge flush with the face of wall and showing the courses of tiles or slates running up the gable looked thin and shoddy.

The chamber floors could be constructed wholly of joists, say, 7 in. by 2 in. or 8 in. by 3 in., with the necessary trimmers for hearths, etc.; or what looked very well in country cottages was the alternative method of wood beams showing under the ceilings, with 4 in. by 2 in. joists above. For ground floors probably the best arrangement for the cheaper type of cottage was open floors, consisting of boards on joists carried on honeycomb walls. Wood-block floors were, of course, nicer in appearance than boards, and where the levels were suitable and it was not necessary to excavate ground, the solid floor was less costly. The flooring which had been used a great deal in the cheaper type of housing since the war was boards laid solid on coke breeze above the site concrete. This flooring, if it was to be satisfactory, required a lot of care. The coke breeze should be properly laid, and on top of this there should be a layer of mastic, on which the boards were laid when it was hot. The underside of the boards should be treated with creosote or solignum, and if tenants were to be discouraged from laying linoleum on the floor, the face of the boards should be stained and varnished. The laying of linoleum on solid floors was fatal to the life of the latter, and there had been an immense amount of dry rot in the unseasoned flooring, often badly laid, and then covered with linoleum, in many thousands of Council houses since the war.

If roughcast was used externally for plastering, it must be put on in two coats, and the smoother kind looked better and did not collect the dust as coarse pebbles or stone did. The first coat should be properly scratched before receiving the second, and the finished roughcast colour-washed and not left in grey cement.

Regarding windows, the lecturer said that much controversy had ensued as to the respective methods of sashes and casements. A good deal, of course, depended on the type of design adopted for the building; a Georgian or formal type of design would have double-hung sash windows, and the Jacobean or more picturesque design, in which the walls and roofs were less formal in outline, would have casement windows. Each of them was quite well in its place, but the two kinds of windows should not be mixed, and in either case the detail should be carefully studied.

He thought box frames for sashes, brought out to within ½ in. of the face of wall, looked better and were more practical than when the frames were set in reveals. In that way one got the full benefit of a wide window-board inside, and the brickwork openings could be built more straightforwardly than where reveals had to be formed. The Victorian type of sash which had a wide centre light and narrow, fixed side lights, looked well and gave plenty of light in the room. Standard steel windows had come much to the fore in recent years, and though they were not so pleasant as the much more expensive steel casement with lead lights, if the design was properly treated they did not look amiss.

I

ROMANTIC EPISODES OF PARIS *

Sir John W. Simpson, a corresponding member of the Institute of France, knowing his Paris from first to last, has given us in this work a short series of essays delightful in both matter and style. For his text he quotes Aristotle (through Francis Bacon) "that the nature of everything is best seen in its smallest proportions," and Bacon goes on to say: "Even so, the nature of this great city of the world, and the policy thereof, must be first sought in mean concordances and small portions." And, as of the great city of the world, so of Paris Of these six delightful essays on Parisian romantic episodes we have a personal predilection for number 11, "Episode Comique," reminiscent of France's great tragedienne, Adrienne Lecouvreur (b. 1692, d. 1730), whose portrait is reproduced in the book. For all her personal beauty, superb talents, many virtues and very few faults, as vice and virtue counted in that hectic age, she was refused Christian burial, or even the "maimed rites" ceded to poor Ophelia and for a different reason. Of the "Comédiens du Roi," Mother Church counted her as outside the pale—technically excommunicate—and the great tragedienne had, in law, no resting-place but the public rubbish-heap. To his everlasting glory, a brave gentleman, one M. de Laubinière, undertook the dreadful duty of Adrienne's secret burial, at dead of night, in La Grenouillère, a marshy field, a musket's-shot distance from the bank of Seine. The story of the lovely but ill-fated Adrienne, so finely told by the author, is merely an episode comic "in the sense that Scarron used the word in his *Roman comique*, and Anatole France in the *Histoire comique*; in no sense excluding matter for pitiful sympathy and tears, as you shall learn —"; but we must leave the reader to learn the full story, at first hand, of Adrienne's joyful life, and tragic end.

This intimate volume may not be for the architect, *per se*, but the architect will find much to interest him pictorially in essay V, dealing with the "Quinze-Vingts" and the Prince Cardinal de Rohan. It is a fine, graphic story of the "Quinze-Vingts," the fifteen-score of Parisian indigent blind, from their first settlement in the quarters given them by Saint Louis in 1254, their second home in the Rue Saint-Honoré in 1750 and their final transference to the old barracks of the "Mosquetaires du Roi" in the Faubourg Saint-Antoine. Thanks to Cardinal Rohan, they went there just before the Revolution, and there they are to-day, increased to some eight hundred. Introductory to this episode, the author gives us the true story of Cardinal Rohan and the Queen's diamond necklace. The necklace never was the Queen's, and the Cardinal was shamefully duped. As an incident, the "Affaire due Collier" was of little importance in itself, but it bulked largely as one of many *casi* that went to the sowing and full fruition of the Revolution and the tragic end of Marie Antoinette.

Great chances turn on small happenings; again, if the Duc de Sully had not taken that fatal if much-needed bath, peradventure Henry of Navarre had not been murdered. But murdered he was, as he himself fully expected, and we can read all the details of his taking off and all the weird legends of the seven days' anticipatory announcements of the murder.

When we have revelled in "A Cage for Comedy" the story of For l'Evique, one of the smaller malodorous prisons reserved for small non-political fry such as refractory members of the Comédie Française, who went there to cure their fits of tantrums, at the polite invitation (so to speak) of the King, and remained there till Majesty relented and never thought of leaving (except at very urgent professional call), although the doors were practically unbarred—we shall begin to know something of the humorous side of Parisian life in the eighteenth century.

Last, but not least, in reading essay VI, "Peradventure" (I Thermidor; II Vendémiaire) we shall realise more than Carlyle told us of the "whiff of grape-shot" and Bonaparte's election at the age of 26 to the command of the Home Army. It is in "the strange interlocking of circumstances which we call coincidence" that the author largely deals. We see how at the forked-road of chance Robespierre at the fatal moment chose the wrong path which led to ignominious death, and then how the young artillery officer, led by fate or chance, was at a precise and propitious moment at the corner of the Rue Vivienne—just when De Lallot was haranguing the troops of the Convention—and but for that, peradventure, the "Man of Destiny" might never have "arrived."

* "Paris Rosemary for Remembrance of Bygone Scenes and Circumstances." By Sir John W. Simpson, K.B.E., P.P.R.I.B.A. 256 pp.; xvii. illustrations. (Hutchinson.) Cloth 8vo. 12s. 6d. net.

"THE BUILDER" DEBATE

MODERNISM IN ARCHITECTURE.

Sir,—I beg to move: "That the Modernist Movement is a sign of vitality and progress in the Art of Architecture and one to be encouraged."

Many hard things have recently been said against "modernist" buildings of the type advocated by Le Corbusier. An eminent architect recently described this new style as "the architecture of robotism." But can these criticisms be justified in actual fact? Are not the critics judging hastily the whole movement from a few examples which they may have seen, rather than considering carefully the *raison d'etre* of the style and studying the many good examples which have been erected in Europe before venturing a criticism?

The modern movement in architecture is not, as some would have us believe, confined to a few bold spirits seeking self-advertisement in the production of something startling. On the contrary, it is a world-wide movement. Architects of many countries are striving independently to a common end—the evolution of a style of architecture which will adequately express the spirit of the age. And there is a distinct need at the present day for such a style, for architecture has become sadly divorced from construction.

The twentieth century has brought with it many changes, and not the least of these has been the revolutionary change in methods of building construction. Modern buildings are vastly different in scale from those of the eighteenth century; they are constructed differently; spans are large and supports small in area; the whole framework, in fact, is different, yet the traditional school of architects still continue to strive to adapt the architectural forms of the Renaissance to buildings for which they are but little suited. Instead of clothing the bare bones of the building, they prefer to hide them altogether. There is no question that a more rational result can be obtained by treating steel-framed and reinforced concrete buildings in the so-called "modernist" manner, in which the constructive elements are utilised for the expression of architectural design, rather than by covering up the construction with screen walls, on which classic forms are placed which bear but little relation to the internal arrangement.

And what of domestic architecture? The requirements of a modern house are vastly different from those of the eighteenth and nineteenth centuries. The present-day servant problem, the universal use of the motor-car, the demand for smaller rooms, labour-saving devices, more daylight, better ventilation, sanitation, etc., are all having their bearing on modern domestic architecture, and architects are finding it increasingly difficult to satisfy all modern requirements in a house, while still clinging to traditional styles of architecture which were designed to suit different conditions. It is true that England has a very fine tradition in domestic architecture; there is no reason, however, why we should slavishly copy the older styles: we should rather take inspiration from them by noting how well the architects of those days solved their problems, and by attempting to solve ours in an equally successful manner.

The present age, then, being different, requires a different style of architecture. That is the modern problem, which the "modernist" school is attempting to solve. To do this it is necessary to demolish many artificialities before a new vital architecture can be built up. Extraneous ornament must be abolished: we must go back to first principles in architecture. The modern designer seeks to do this by creating abstract forms, which, though not traditional and perhaps somewhat strange at first sight, have nevertheless a simple beauty of their own. To this end he often uses concrete as being the most suitable material for the purpose, since it is plastic, easily moulded, and has no tradition behind it—an advantage from the designer's point of view. Notwithstanding, it is a fallacy to say that the shapes or forms used are inspired by or suggested by the use of concrete. Modernist buildings in brickwork and even stone have been erected, particularly in Holland and Germany.

A well-designed concrete building in the new style has a fascination of its own, and examples are in existence which will rival from an æsthetic point of view any building in brick or stone. Objections have been made to concrete buildings on the score of drabness of surface treatment. This is due to the mistaken idea put forward by some modern designers that massing and good proportion are the only requirements in concrete building, and that surface treatment does not matter. The surface of concrete buildings can, however, be treated in a pleasing manner. There are at the present day several methods of obtaining a pleasing texture, both by choosing a suitable aggregate and allowing it to show, and also by the after-treatment of the surface, or by rendering with a rough mixture. Concrete buildings can also be coloured, either by incorporating the colouring material with the wet mixture, or by painting the surface. Many pleasing effects can be obtained which take away any reproach which could be levelled at concrete.

A style of architecture should not be judged by its failures. There are failures in every style, and this one is no exception. Some modernist buildings have been erected which are æsthetically unsound, but without a few failures there is no progress in art, and a glorious failure is sometimes better than a successful mediocrity, which may be merely a copy of a previous building. The chief ground of objection to this modern work would seem to be its newness, its unfamiliarity of form. We are in this country particularly a conservative race; we dislike innovations, and there is an unconscious prejudice against anything new. Yet to copy old buildings leads to stagnation in art; we are all ready to condemn the styles of the Victorian age, we are amused at Victorian insurance offices decked up and disguised as churches, but we do not always realise that a future generation will probably condemn, as bad art, our huge "Georgian" blocks of flats and departmental stores with classic columns of monstrous size standing on sheets of plate-glass.

The present age demands designers of originality of thought and ideas, not mere copyists versed in classic detail with Gibbs's orders as their supreme authority. Conditions have changed so rapidly that serious thought is needed for the adaptation of architecture to modern needs. In that way only lies salvation. The exponents of the modern movement in architecture, far from being scoffed at, should be hailed as pioneers, who are attempting to combat architectural stagnation and to infuse it with fresh vitality.

"Positive."

ARCHITECTURE, NATURE AND MAGIC—III

By W. R. LETHABY.

CHALDEA AND EGYPT.

Having tried to open out a general prospect of our subject, this and the two following sections will be of the nature of a history of architecture in antiquity as thought or idea; that is, as seen from another than the usual points of view. Archæological research is more and more showing that civilisations producing art of an advanced character were first established in Western Asia, and that the arts of Egypt derived to some extent from this source. The monuments of the Sumerians in Mesopotamia and those of the populations dwelling in the Indus valley were not built of such lasting materials as those of the Nile country, but the cultural traditions embodied in them were probably earlier than those of Egyptian architecture. In the current number of *Antiquity* (March, 1928), Dr. H. R. Hall of the British Museum gives an account of the general results of explorations at and around Ur during the last six years, and concludes that the priority of Sumerian civilisation has now been definitely settled. (See also the new volume on the History of Assyria by Mr. Sidney Smith.)

In Assyria, according to Maspero, it was believed of the dead that "the gods of heaven received heroic souls into their own kingdom upon the summit of the *Mountain of the World*. This mountain occupies the southern region of the universe. One side of the starry firmament leans upon its summit; the sun escapes from its eastern flanks every morning to return to it in the west. . . . When the people leave this earth they hope to meet upon the summit of the *Mountain of the World*, amongst the 'silver clouds.'"

On two Egyptian mummy cases in the British Museum are prayers that the deceased "may live with the stars that never set"—that is in the circumpolar region.

A sacred mountain was known alike to the Celts of the West and to the Chinese in the East. The peak rising to heaven might be identified with some particular mountain, as, for example, with Olympus by the Greeks, on which see Dr. Cook's *Zeus*. While I am writing this a letter appears in the *Times* (December 29, 1927) which tells of an African heaven mountain.

"I live on the slopes of Kilimanjaro, and have been asked when people climb the mountain what white people want up there in the snow. 'Do they want to find the treasure?' . . . They state that the belief is that the first Menelik, Negus of Shoa, and son of King Solomon and the Queen of Sheba, conquered this country. When he was old he brought his army to Kilimanjaro. He ascended the mountain with his officers and slaves carrying treasure, stones and gold, also Solomon's ring, which he had on his finger. They saw him reach the snow on the summit when clouds came and hid the view. The officers came back without the king, who had been left by his own orders in the crater which is on the summit. They then went back to Abyssinia. Belief is that a king will arise who will possess the old king's spirit and will reconquer this country which they still call Ethiopia." (P. J. Sinclair.) In such a mountain rising to the sky we have another aspect of the world structure. It is now the earth rather than the heavens, a mass instead of a chamber. Like the other, it was the parent of many remarkable monuments.

. . . . . .

The artificial hills of brick erected in Mesopotamia and known as *Ziggurats* were ritual imitations of the holy mountain, having at the summit a shrine prepared for the visitation of the god to whom it was dedicated. "And it came to pass as they [the sons of Noah] journeyed east that they found a plain . . . And they said, Go to, let us build us a city and a tower whose top may reach unto heaven."

The ruins of one of the earliest of these stepped-towers have been found at Nippur, on the plain of Shinar. "This tower, of burnt brick, was the sacred mount of *Enlil*, the great Sumerian god of the air, a holy place revered among all the Sumerian community. This temple-mount was a building tapering upward, something like a pyramid. The Sumerians erected this building probably in the effort to give their god a home on a mountain-top such as he had once occupied before they left their mountain home to dwell on the Babylonian plain . . . The tower was not itself the temple of the god, although he had a shrine at the top. Alongside the tower there was a small temple building proper. Walls of sun-dried bricks enclosed a court, behind which was the sacred chamber. Around the temple and its mount were grouped store-houses and offices of the temple. Here ruled a wealthy priesthood" (Breasted) The most perfectly known Ziggurat is that at Ur, recently explored by Mr. C. Leonard Woolley, whose description, given in the *Antiquaries Journal*, I venture to condense.

"Every important city of Mesopotamia boasted a Ziggurat or staged tower. The Ziggurat of Ur was a rectangular structure 65 by 43 metres, and was solid, the core being of mud brick, and the facing of baked brick. It was built in stages which diminished in area." These had sloping sides; the bottom stage was nearly 10 metres high, the others being much less; at the middle of the top platform there was a small temple. "The Egyptian pyramid conceals a tomb chamber, the Ziggurat gives prominence to a temple. Essentially the Ziggurat is an artificial hill. The type apparently originated with the Sumerians, who, coming from a hill country into the plains, found themselves at a loss how to worship, after the manner of their forefathers, the mountain deities. It was almost inevitable that the idea of a hill with which the building originated should soon be complicated by a symbolical idea. The artificial hill is a God's Hill, the seat and throne of the city's god. Since the earthly temple that crowns the Ziggurat is the reflection of his celestial house, the mound itself becomes a symbol of the heavens. Consequently it should in line and colour correspond to what is known of the order and nature of the celestial spheres." Names were given to these towers, such as "The House of the Mountain," "The Link between Earth and Heaven," "The Holy Hill," "The House of the Mountain of all Lands." The tower at Ur was within the temenos of the temple of the Moon God, the patron deity of the city. The face of the great lowest terrace was broken into recesses, with piers of slight projection between. Access to the first platform was by three long converging stairways: two were against the side of the structure starting from the angles left and right, and almost meeting above; while the other stair was at right-angles and central.

"At the back of the landing on which the three staircases converged there was a monumental gate: the foundations of its two heavy piers survive. Of the shrine at the top nothing was left. That it was faced with blue glazed bricks is certain, for these were found throughout the debris, so that they can only have come from the summit. . . . The shrine was bright blue shining in the sun. The top [terrace wall] was built of bright red bricks and was covered with plaster of the same colour. Below this the whole was black, the brickwork covered with a thin coat of bitumen. Below, again, was the whitewashed wall of the court. The four colours in their order—white, black, red, and blue—have their astronomical significance, representing the zones of heaven, so that the Ziggurat is indeed the heavenly hill of the god." A note adds: "The colours of the Ziggurat are a contribution to a much discussed question. The blue of the topmost shrine is confirmed by inscriptions. Place reported colour upon the Ziggurat at Khorsabad. From the facts that some famous Ziggurats bore names which suggested that they were of seven stories, the theory was developed that the normal type was of seven stories, each coloured the hue that was conjectured to symbolise the Sun, Moon, and five planets. . . . It is quite certain that seven was only one of the numbers which a Ziggurat might have, three or four being equally common. It is therefore impossible to maintain this theory of the planets, but as the Ziggurat seems to represent an artificial mountain, with the abode of the god upon the summit, there is every reason to see a cosmological significance if the precise meaning is uncertain" (C. J. Gadd). Evidence which points to the conclusion that when these towers had seven stages there was reference to the planets or seven heavens was considered in my former essay. The only point I can see against it is that on the Assyrian reliefs a group of seven stars is often associated with the sun and moon, that is, there were seven in addition to the sun and moon. In ancient India, as we shall see, there were "seven precious substances," being gold, silver, and coloured stones. The colours of the Ziggurat at Ur may be compared with those of the curtains of the Tabernacle described in "Exodus." Possibly they signified the four elements or the four quarters of the world, to which in many countries colours were assigned.

The Ziggurat explored by Victor Place is described by Maspero (speaking in the present of its supposed perfect state) thus: "The tower has seven stories, consecrated to the divinities of the seven planets, each painted with the colour of its deity—the first in white, the second in black, the third in purple, the fourth in blue, the fifth in vermilion, the sixth in silver colour, the last gilded. The upper platform supports a small cupola covered with plates of gold: two stone altars, a statue of Ishtar, a bed, and implements for the sacrifices, form the furniture of the chapel. This is the chamber of the goddess, which the priests and the King only may enter. Her spirit is attached to the statue, from hence she watches over the people and teaches them by the voice of her prophets. Every morning the gilding of the chapel is illuminated by the sun and resembles a fire which all day burns between heaven and earth." Place restored this Ziggurat with sloping ramps rising continuously as they turned around the four sides of the structure. All, however, were not of this type, as the tower at Ur shows, and one carved on an Assyrian slab manifestly resembled that at Ur (Fig. 1). In recent

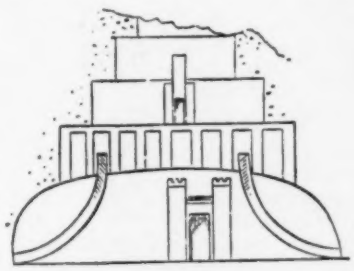


Fig. 1.

comments on these Ur discoveries, Sir E. Wallis Budge writes thus: "The great Ziggurat, or temple-tower, which was built by Ur-Nammu in three stages and symbolised by the construction the heavens and the earth and the underworld, showed us how great and magnificent a city Ur was."

I do not feel certain of the exact explanation of these coloured stages, but it cannot be doubted that they had a cosmical significance.

A tablet deciphered by Mr. George Smith gave the heights of the seven stages of the great tower at Babylon as 110, 60, 20, 20, 20, 20, 50 ft.; the base was 300 ft. square. Herodotus seems to describe this tower as if

it were ascended by a continuous ramp, but the unequal heights show that it must have had distinct terraces; probably those who mounted it were expected to go round the stages and not to make short cuts.

These man-built mountains must have been mightily and magically impressive. What thoughts would have stirred in the minds of the dwellers in the land when the blue sanctuary was seen afar off by day, or when a twinkling light shone from it at night while some ritual offices were in progress! Such was "architecture" in the ancient sense.

Dr. A. B. Cook, writing of "Sky Pillars and Soul Ladders," remarks: "Ladder and pillar coalesce in the stepped tower or *Ziggurat* of the Babylonians, as in the *columna cochlis* of the Romans, to which the spiral tower of Samarra (*s.* X., A.D.)—a direct derivative of the Ziggurat—bears a marked resemblance. The seven steps of the *Ziggurat*—eight if we reckon in, as Herodotus does, the sanctuary on the summit—have undoubtedly a cosmic significance, and correspond with the seven or eight steps of the Mithraic ladder, or, for that matter, with the Sabian ladder of the seven planets" (*Zeus*, II., p. 128). Among his footnotes is given a quotation from Jastrow's work on Babylonia and Assyria (1911): "While no special stress seems to have been laid on the number of stages of which a *Ziggurat* consisted . . . seven seems to have become normal after a certain period. There seems to be no reason to doubt that this number was chosen to correspond to the moon, sun, and five planets, which were the controlling factors in Babylonian-Assyrian astrology. Gudea [an early King] describes the *Ziggurat* at Lagash as the "house of the seven divisions," and from the still fuller designation of the tower at Borsippa as the "seven divisions of heaven and earth" it would appear that in both cases there is a symbolical reference to the 'seven planets,' as the moon, sun and five planets were termed by the Babylonians themselves."

The seven-staged form was repeated in the comparatively late tomb of Cyrus at Passargadæ. "It consists of a small temple-like chamber situated on the top of a small pyramid of stone steps, and [was once] surrounded by a peristyle or cloister of columns."

It was the custom of Mesopotamian monarchs to inscribe their annals and other records of important achievements on tall monumental pillars. On such a pillar the Laws of Hammurapi were minutely cut, *c.* 2100 B.C. This is of hard diorite, about 8 ft. high, with a rounded top. On the upper part is a sculptured relief showing the King receiving the laws from the sun god, who is seated on a throne. This pillar, as the sculpture clearly shows, represents the mountain of the gods. Other later pillars of record had their tops stepped back in a series of ledges, imitating the terraces of the Ziggurats. Two entire obelisks of this kind, with the upper part of a third, are in the British Museum. The last bears an inscription of Tiglath Pileser, King of Assyria 1100 B.C., which records his hunting expeditions. It has, next the stepped top, a little carved relief which shows him receiving his bow from the sun god. Like the great *Ziggurats*, these monuments, by imitating the sky-supporting mountain, shared in its permanency—they were established for ever. Fig. 2 is a sketch of an obelisk erected by Shalmenezer II., 860 B.C., and inscribed with annals of his reign. It was found by Layard in the ruins of a palace, and probably stood in some courtyard. Even little battlements surmounting buildings were notched into the same strength-suggesting form. There is in the Museum a thin slab, about a foot wide notched into seven steps, that looks like an antefix. A little model altar, with incised stepped lines rising to each angle, which is also in the Museum, suggests the question whether "Horns of the Altar" were the four sky-pillars at the corners of the earth (*cf. Zeus*).

Fig. 2.

Now I turn to consider the pyramids of Egypt, which to some extent are obviously

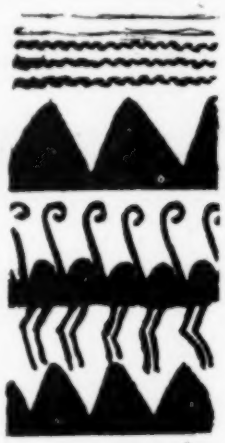


Fig. 3.

kindred monuments to the Ziggurats. As is well known, the earliest large pyramid in Egypt was the stepped structure at Sakkara built by King Zoser of the third dynasty. Not only is it of stepped form, but, like the early Ziggurat of Ur, it is oblong and not square in plan. The idea of building a mountain-like mass came before the exact geometrical form of the pyramid proper was developed. That the Egyptian pyramids were thought of as artificial mountains, and acquired sacredness by such symbolism, may not be doubted; there must have been a strong force of imagination behind the energy which piled up these mighty monuments of stone.

A fragment of a vase of the pre-dynastic are, say, 3500 B.C., which was given to me many years since, is surrounded by a painted band which represents a row of flamingo-like birds between two rows of mountains. The whole can hardly be anything else than the Nile Valley between its high, rocky banks, which are broken up by many transverse gorges into peaked masses. Having written this, I went to the Museum to examine other vases of the same age and kind that might be there. What I found confirms the view that the "decoration" on the pot was meant for the great river and the cliffs which form a boundary to the valley. Many other pots of the same kind had boats on them, and some of these had the mountains as well. One of the vases had a narrow strip between the two rows of mountains filled with a zig-zag of water. Thus, mountains were painted as pyramids long before the age of pyramids, and it is evident that when real pyramids were erected they were known, and intended, to be in what had been received as the typical form of mountains. These mountains of stone, however, would not have been imitations of mountains in general, but of the great mass which rose to the sky. Sir W. Flinders Petrie's general description of the three great pyramids may here be quoted: "The essential feeling of all the earliest work is rivalry with nature. . . . The Egyptian selected a range of desert hills over a hundred feet high, and then subdued it entirely, making of it a mere pedestal for pyramids which were more than thrice as high as the native hill on which they stood. There was no shrinking from a comparison with the work of nature; but, on the contrary, an artificial hill was formed which shrank its natural basis by comparison, until it seemed a mere platform for the work of man" (*A History of Egypt*).

The entry to the other world was supposed to be in the mountains on the west of the Nile Valley, and many a later tomb painting shows the tomb at the base of a mountain slope, the skirt of the great world mountain. "The Egyptians believed that the tops of some mountains touched the floor of heaven, which was formed by a vast rectangular plate of iron" (Sir E. Wallis Budge). The hills to the west of Giza, where the great pyramids are situated, were low and unimpressive, and they were consequently improved by art to be better representations of the world mountain.

Professor Breasted says that the pyramid is a symbol sacred to the Sun-god. In Dr. A. B. Cook's *Zeus* I find a conclusion stated which is in full agreement with my own thought that the pyramids represented the earth rising to the sky, the heaven-upholding mountain, the most stable of all things. After a reference to pyramids, early and late, and beyond the borders of Egypt as well as within, he proceeds: "All these and other related types (cones, etc.) ought to be made the subject of a thorough-going investigation. It would, no doubt be found that the structures in question were produced by a combination of factors, some of practical exigency, some of symbolic significance. I shall content myself by suggesting that the root-idea was that of a mountain reaching up to heaven—an idea comparable with those of the sky-pillar, the soul-ladder, the stepped spiral tower" (*Zeus*, Vol. III.).

In his *Myths of pre-Columban America*, Mr. Donald A. Mackenzie writes thus: "Pyramids and cairns were symbols of the world-pillars. They were specially connected with the sun cult, which regarded the sun as the child of the Mother Goddess. The sun emerged from the "Mount of Dawn" and returned to the "Mount of Sunset," or it emerged from the Tree of Life that supported the world. Burial mounds in America and Asia were, like the Babylonian temples, sacred 'mountains,' symbols of the deity, who was the giver of life at the beginning and who animated the body after death."

The Pyramids were very exactly orientated, and this is a further proof of their symbolical character. Mariette says that the sides of the pyramids were dedicated to the four quarters, and Sir W. Flinders Petrie remarks on "the accuracy of star observation" shown by their setting out. In Egyptian inscriptions of later date phrases occur relating to buildings, like—"It is such as the heaven in all its quarters": "Firm as the heavens." As the "firmament" was stable and not to be moved, so the structure that was in proper relation to it acquired magic stability.

"The squareness and level of the base is brilliantly true; the flatness and squareness of the joints being extraordinary. . . . The laying out of the base of the great pyramid of Kufu is a triumph of skill: its errors both in length and in angles could be covered by one's thumb; and to lay out a square of more than a furlong on the side (and rock in the midst which prevented diagonal checks) with such accuracy shows surprising care. The work of the casing stones which remain is of the same class; the faces are so straight and so truly square that when the stones were built together the film of mortar left between them is on an average not thicker than one's thumbnail, though the joint is a couple of yards long, and the levelling of them over long distances has not any larger errors. . . . Various theories fare badly; the only important one which is well established is that the angle of the outside was such as to make the base circuit

equal to a circle struck by the height as a radius." (Sir W. Flinders Petrie.)

Much has been said of the fact that the height of the great pyramid bears to one side the ratio of 7 to 11, or to the sum of the four sides the ratio 7 to 44. The last is about the relation of the radius of a circle to its circumference and it is claimed that this was intentional as embodying the ratio π. In any case, 7 to 44 is only an approximation to π, and according to Sir W. Flinders Petrie the exact dimensions were obtained by using a large unit of measurement, the height being 7 × 40 cubits and the length of a side 11 × 40 cubits. (The use of a large unit of measurement seems also to have been the Greek method of setting out their temples.) The angles of the faces is 51 deg. 52 min., that is, nearly 6 deg. more than 45 deg.; on the other hand the diagonal angle is considerably less than 45 deg. (Fig. 4). Looking at this diagonal angle we may see how flat the slope of the corners of the stones at the angles was and we may judge

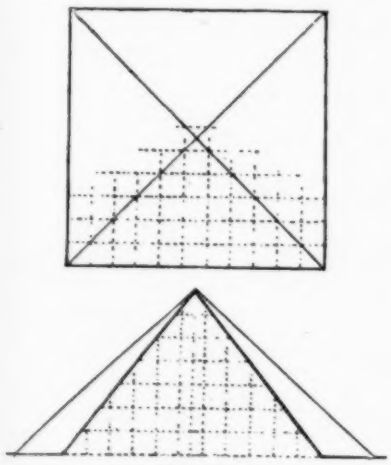
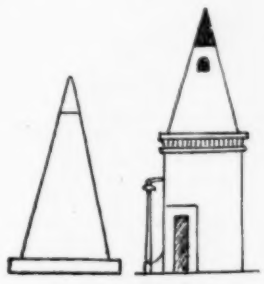


Fig. 4.

that it would hardly have been possible to execute a great *coursed* structure at a flatter angle. Choice of slope was thus limited in one direction, and if it had been greater the immense mass would have been still greater. I should say this was the chief factor in determining the angle. I considered the question in a little book, *Architecture*, in 1912, and came to the conclusion that the angle was reached as a stage in the progression from flatter to steeper slopes. "The tendency of pyramid design seems to have been to attain height, to build a structure that should reach to heaven. The ideal pyramid as depicted in the hieroglyphs was very acute from the earliest time. The Great Pyramid, named "The Glory of Kufu," seems like a hill of stone rising from a base of over 13 acres. When it was new and sharp it must have gleamed cold and white like the peak of an alp rising above the burning golden sand."

At the third pyramid the sloping sides of "the granite blocks were left with an excess of stone in order to protect them in transport." This method of building with a rough face and dressing down afterwards is mentioned in several other cases, and was doubtless the procedure at the great pyramid. The casing stones were nearly 5 ft. high. Fragments in the British Museum—now very dirty—show that they were of fair white limestone, the beds and faces dressed to a polished surface. The sides of the great work were true planes, the angles accurate and sharp, the apex a point indeed. As the sun in its course illuminated the several sides of the mass they would have indicated the changing seasons and phases of the day. It would actually have shone and it must have been a most amazing thing.

That thoughts of the heavens were in the minds of the builders of the first pyramids is shown by the fact that the soffit of the doorway in the burial chamber of the stepped pyramid at Sakkara has stars carved on it, and other fragments found suggested that the ceiling was "decorated" in a similar way. While I am writing it is announced that Mr. Cecil Firth has just discovered burial chambers beneath this pyramid which, "except for the great granite chamber form the most important part of the underground complex . . . the walls are lined with blue tiles" (*Times*, March 5, 1928). These linings of blue tiles can hardly



Figs. 5-6.

have been adopted for any other purpose than to take the hues of the sky into the tomb. It has been thought that this, the earliest pyramid, had never been cased in fair masonry, but Mr. Cecil Firth's explorations revealed in 1925 that it "had been covered with a coating of fine white limestone like the fourth dynasty pyramids at Giza, but in step form, and that the step-like structure now visible was only a rough core."

Several small tomb chapels of later date represented on the papyri had square tower-like lower stories roofed above by acute pyramids. One of these on the papyrus of Ani is sketched in Fig. 6. Notice the black apex and compare with Fig. 5; was this part supposed to be the heavenly region? Perrot and others have thought that the great pyramids might have been coloured in bands like the *Ziggurats*.

That the cosmical significance of pyramids was understood in the later Egyptian ages is shown by a large number of little memorial pyramids with bases from about 16 to

Fig. 7.

20 inches square, several of which are in the British Museum. The surfaces are covered with carvings of religious import, and at the apices of nearly all are representations of the two eyes of Horus (Sun and Moon), or of the barque of Ra floating on the heavenly waters (Fig. 7). These pyramidettes have slopes much steeper than the angles of the great pyramids. And that the ideal pyramid was acute from an early time is shown by the hieroglyphs. Fig. 5 is from an early example reproduced by Capart.

The Tower of London.

A reference is made in the annual report of the National Physical Laboratory to the fact that there is a slight movement of the quay wall and the Salt Tower of the Tower of London, but it was stated at the Office of Works, says the *Times*, that the movement was almost imperceptible and entailed no danger to any part of the Tower. The Salt Tower is situated at the south-east corner of the old fortress, and, next to the White Tower, is the most ancient of all.

ILLUMINATING A MUSEUM

Mr. H. C. Weston delivered an address recently to the Illuminating Engineering Society at 32, Victoria-street, on the illuminating of the Home Office Industrial Museum. The lecturer said that the establishment of the Home Office Industrial Museum was decided upon before the war, and the building, though erected then, had only been equipped during the past two years. The museum was intended to be a permanent exhibition of the best methods, arrangements and appliances for ensuring the safety, health and welfare of the human element in industry, and new exhibits would be included from time to time as they became available. The museum, which was the only one of its kind in the country, was open to the general public in the mornings, and was available in the afternoons for visits by those who were directly concerned with problems of safety, health and welfare in industry. The floor space available for exhibition in the gallery and on the ground floor was approximately 10,000 square feet, while in the basement a lecture hall was provided, together with rooms devoted to ventilation and lighting. So far as lighting was concerned, in addition to the exhibits contained in the room devoted to the demonstration of the principles and methods of illumination, the lighting installation throughout the whole museum was itself an interesting exhibit. The installation had been planned to provide an initial illumination of 15 foot-candles, except in the lecture hall, where the illumination was 7.5 foot-candles. All the fittings used, including switches, fuse boards, plugs, etc., like most of the exhibits in other sections of the museum, had been lent by various manufacturers, and the cost of equipping the museum had therefore been small. For the illumination of the bays under the gallery on the ground floor of the museum reflector-refractor fittings containing 300-watt gas-filled lamps were used, while five 1,500-watt gasfilled lamps with R.L.M. reflectors were mounted close to the glass roof of the well, and illuminated the central floor space. The gallery was mainly illuminated by superheated gas units, with clusters of nine mantles, each unit being designed to give about 27,000 lumens. The basement and offices were electrically lighted, and certain of the machines exhibited were provided with local lights. In the gallery there was an exhibit of safety electrical equipment, and, in the welfare section, a small artificial daylight window. The main objects of the exhibition were to illustrate the first principles of lighting, to show the relation between the nature of the work and the amount and kind of illumination required, and to draw attention to certain conditions found in factories which affected the efficiency of the lighting installation. Important exhibits were those which demonstrated the effect of illumination on the rate of perception, and the effect of direct glare from bright unscreened light sources near the line of vision. Not only were accidents caused by failure to provide sufficient illumination to permit the quick perception of obstacles or moving parts of machinery, and by the temporary impairment of vision brought about by glare, but serious loss of output also resulted from these conditions. Two exhibits illustrated the importance of keeping lamps and fittings clean if loss of efficiency was to be avoided. The advantage of roof lighting in securing even illumination was also shown. The effect of the colour of the walls of a room upon the illumination secured from a given installation was shown in another exhibit, while the influence of the spectral composition of the light used on the discrimination of slight differences of colour was demonstrated. The lighting exhibition was not final; there was room for additional exhibits, and suggestions for the improvement of those now shown would, said the lecturer, always be welcomed.

SOCIETIES AND INSTITUTIONS

THE INSTITUTE OF BUILDERS.

At a lecture to members and others of this Institute, on March 23, at the Polytechnic, Regent-street, Mr. W. W. Dove, F.I.O.B., presiding, Capt. W. T. Creswell, barrister-at-law, in dealing with "Building Contracts and Sub-contracts," referred to those contracts entered into without any written form of agreement or price being fixed for the work. Such contracts should be avoided, in that they led to disputes; and in all these cases the contractor could only claim a fair and reasonable remuneration for his work.

Dealing with those instances where contracts need not, or again must, be in writing under statute, various settled forms, which have been in use, were compared with the proposed new form of contract now under review. Forms were mainly drawn up in accordance with Case Law as existing at the date of their settlement. Such agreements were often puzzling, and many thought them too long and complex. In this respect the new form is an improvement on, for instance, the 1909 form of contract. Opportunity was taken to indicate how in some matters it could still further be improved.

If and when the new form was settled, it of course could be waived at any time by agreement between the parties, though it was a mistake to alter it indiscriminately, since many of the clauses were mutually dependent on each other.

Contracts with public bodies, and under statute, were dealt with, and when it was necessary for them to be under seal.

All documents forming part of a building contract must be construed together. The articles of agreement prevailed. When the bills of quantities formed part of the contract, they were to be regarded as defining the amount of work included in the price, and as statements of fact; and if the contractor was called upon, in order to complete the work, to do more than was taken up in the bills of quantities, he was entitled to be paid for such excess in addition to the contract sum.

The position when there was inaccuracy in the bills of quantities was dealt with, also variations over the contract both when a variation order had been given and, too, when one had not been given. In these matters the new form was fair to both parties. Full opportunity was given for review by the arbitrator under the new form of contract.

The building industry was full of complexity in that it was a combination of trades. The ordinary building contract consisted of five parts or divisions: (1) The building owner; (2) the architect; (3) the contractor; (4) the sub-contractor or manufacturer; (5) the operative.

All needed to be trained to their respective part, and to be well balanced and provided for in any contract. A good form of contract should protect all their interests.

ARCHITECTS' AND SURVEYORS' APPROVED SOCIETY.

The annual general meeting of this society was held at the Surveyors' Institution on March 27, Mr. A. Goddard, C.B.E., being in the chair. The report of the Government auditors, showing the Society's assets as amounting to £12,721 15s. 6d., was adopted, and the following gentlemen were elected to serve on the Committee of Management:—Mr. A. Goddard, C.B.E. (representing the Surveyors' Institution); Mr. Ian MacAlister and Mr. H. D. Searles-Wood (representing the R.I.B.A.); Mr. F. R. Yerbury (representing the Architectural Association); Mr. O. H. Cooke and Mr. J. W. Denington, L.R.I.B.A. (representing the Association of Architects, Surveyors, and Technical Assistants); Mr. R. G. Strachan, F.S.I.; Mr. A. A. Beckham, P.A.S.I.; Mr. W. J. D. Import, F.A.I.; Mr. Arthur Scandrett; Mr. P. Scott Martin; Mr. W. J. Waghorne, F.R.I.B.A.; Mr. H. Worley.

Mr. Goddard was unanimously re-elected as Chairman and Mr. Searles-Wood as Treasurer.

The scheme, agreed upon between representatives of the dental profession and approved societies, for a standardised scale of dental charges to insured persons, was adopted after some discussion, the Chairman having pointed out the advantages that would accrue to all concerned by the adoption of the scheme.

The Chairman then called attention to the advantages of members continuing as voluntary members of the Society on ceasing to be compulsorily insured under the Health and Pensions Insurance Acts through increase in salary to exceed £250 per annum. He pointed out that a man who had just previously been compulsorily insured for two years and who commenced voluntary insurance at the age of 30 by paying a weekly contribution of 1s. 3d. stood to gain more than he had paid into insurance, in respect of pensions alone, these having been actuarially valued, for a man of 30, at the weekly rate of 1s. 8½d.; and that, in addition, he would be entitled to claim the ordinary health benefits and various useful "additional benefits" without increase in his rate of contribution.

The proceedings then terminated with a vote of thanks to the Council of the Surveyors' Institution for their kindness in allowing the meeting to be held at the Institution, and for their hospitality in having tea provided for members.

R.I.B.A. PRIZES AND STUDENTSHIPS.

Tite Prize, Soane Medallion, and Victory Scholarship.

Attention is drawn to the fact that since the scheme for the R.I.B.A. Prizes and Studentships was modified the following entries have been received:—

The Tite Prize.—1925-1926, 41; 1926-1927, 64; 1927-1928, 114; 1928-1929, 150.

The Soane Medallion.—1925-1926, 13; 1927-1928, 25.

The Victory Scholarship.—1926-1927, 18; 1928-1929, 43.

These figure do not include students taking the competitions in the Dominions.

SOUTH WALES INSTITUTE OF ARCHITECTS.

At the annual general meeting of this Institute, held on March 8, the following officials were elected for the year 1928-29:—

President, Mr. C. S. Thomas, F.R.I.B.A.; Vice-Presidents, Messrs. C. F. Ward, F.R.I.B.A., and T. Alwyn Lloyd, F.R.I.B.A.; Hon. Treasurer, Mr. H. Teather, F.R.I.B.A.; Hon. Auditor, Mr. J. Herbert Jones, F.R.I.B.A.; Hon. Librarian, Mr. R. H. Winder, M.A., A.R.I.B.A.; Hon. Secretary, Mr. Ivor P. Jones, A.R.I.B.A. (All re-elected.)

St. Paul's Society.

At the meeting of St. Paul's Ecclesiological Society, held on Wednesday, March 21, at the R.I.B.A. Gallery, to which the members of the Gilbert White Fellowship were invited, Mr. H. J. L. J. Massé lectured on "Some Oxford Colleges." He said that it was impossible to say everything that could or should be said about the five colleges selected for the evening's lecture, viz.: Merton, Oriel, Magdalen, Wadham, and the old buildings at Worcester, and that he would rather try to interest those present in some miscellaneous information which they would not find in the ordinary guide-books. On a map he showed the position of the walled Oxford of early days and indicated the position of the remnants of walls now visible. Beginning with Merton—the mother of colleges, founded in 1264—he showed how the college life developed from the life in a hall. In similar fashion, the remarkable interesting library had developed from the early educational books kept at first in boxes or chests. Tracing the development of the building and the building of the chapel on the site of a parish church dedicated to St. John, he said the chapel was never finished as had been originally intended. It was mainly thirteenth-century work, with a Sacristy (used for long years as a brewhouse), which was certainly built before 1311, and an ante-chapel. The fine tower was fifteenth century, and there was some thirteenth-century glass in the chapel.

The Fellows Quad was said to be contemporary with the Old Schools Quad and part of the Founders' Tower at Wadham. The hall had been ruined by Wyatt and restored later. The new buildings in the Grove by Butterfield (1864) were a story lower than they had been planned, and the college had run a considerable risk from the apathy and carelessness of the dons in the early sixties of losing the old Mob Quad altogether. The new buildings by Champneys were on the site of the old St. Alban's Hall, which had been absorbed by the college.

At Oriel—the first Royal Foundation at Oxford—founded by Adam de Brome, Almoner of Edward II., and known first as King's College, later as Oriel, there was nothing left of the pre-Reformation college buildings, the present old buildings being mainly restorations of earlier erections of the time of Charles I., many being completed a century later.

Magdalen was founded in 1459 by William of Waynflete on the site of an old hospital of St. John, of which there were traces in the Chaplains' Quad between the Porter's Lodge and the Bell Tower. The chapel interior was mainly a modern restoration by Cottingham, with an interesting reredos and a small chapel containing the fifteenth century tomb of Richard Patten of Wainfleet, the father of the founder. The Tower was rather later, and was not finished till 1507, and seems to have been intended to be a detached tower. It has been very carefully restored by Mr. E. P. Warren, and a new St. Mary by Dressler put at the top in place of the old one, which was quite decayed. There is a legend that it was designed by Wolsey, an old Magdalen man. On May 1, annually, at 5 a.m. a Latin hymn has been sung on the top of the tower by the choir. In the hall the roof is modern (Bodley), on the lines of the original roof, but the old panelling is said to have come from Reading Abbey. The buildings in Deerpark dated from 1735, and they were considered such a success that there was some talk of destroying other parts and rebuilding in the 1735 style. Magdalen College School had a fine hall (by Buckler—1851), and with the rest of the college formed the most beautiful range of buildings in Oxford.

In dealing with Wadham, his own old college, the lecturer said that the wonderful fabric of 1612-1618 had not in its essentials been changed. Repairs in chimneys and gables and some refacing had been necessary, but the college would be easily recognised by an undergraduate of that time—if he could revisit it after 300 years. The interesting point in the chapel was the building of perpendicular windows in the 17th century by Somersetshire masons working in their county tradition, while the ante-chapel was being done by masons who were making Jacobean windows of a less interesting type. The lecturer showed how the college escaped being built on the site of Gloucester Hall, and was built instead on the site of the Augustinian Priory that had been destroyed.

Concluding with the old buildings or "cottages" at Worcester College, he explained how the original foundation was intended to form headquarters in Oxford for students from the thirty odd Benedictine monasteries existing in pre-Reformation times and how the Dissolution of the Monasteries by Henry VIII. had put a stop to the usefulness of the hall. He stated that a wealthy benefactor had by his money caused the distraction of one side of the Quadrangle and how the "cottages" had been saved merely by lack of means.

SOUTH WALES ARCHITECTS.

THE seventh annual supper of the South Wales Institute of Architects (Eastern Branch) was held under the presidency of Lieut.-Col. E. H. Fawckner, F.R.I.B.A., at the Queen's Hotel, Newport, on March 23. The president was supported by the following:—Messrs. Percy Thomas, V.-P.R.I.B.A., C. S. Thomas, F.R.I.B.A., Ivor Jones, A.R.I.B.A., H. Teather, F.R.I.B.A., C. F. Ward, Alwyn Lloyd, F.R.I.B.A., W. S. Purchon, M.A., A.R.I.B.A., J. Herbert Jones, F.R.I.B.A., Horace Jones, L.R.I.B.A., J. M. Broadfoot, J. R. Rees, L.R.I.B.A., Reg. Hayman, L.R.I.B.A., C. E. Tebbs, A.R.I.B.A., Johnson Blackett, A.R.I.B.A., and C. E. Page, L.R.I.B.A.

The loyal toast being honoured, the president, in proposing the toast of the "R.I.B.A. and Allied Societies," said that it was interesting to note that there were 6,500 members of the R.I.B.A., while, with the allied societies, the total number of architects was 13,000. The Institute and allied societies were really important bodies.

Mr. C. S. Thomas (president of the South Wales Institute of Architects), in response said his generation were interrupted in their progress by the War. That generation could not change much. It depended upon the younger generation, who could study traditions, and introduce culture in their work, for, by that means, they could educate and get culture among the citizens of the towns they adopted. The greatness of a town or city did not depend upon the number of its inhabitants nor the size of its buildings. It depended upon the general culture of its citizens, and, in that respect, most of its culture was typified in its architecture.

Mr. Percy Thomas, V.-P.R.I.B.A., said there had been a great deal of criticism against the Institute, and sometimes it was well founded, but often was hardly fair. The Institute had been through a difficult time. It was for many years a London society, but now it had changed, and was an immense organisation. It contained members all over the British Empire—a feature which, he thought, was unique. He did not think there was another professional organisation which had members in the Dominions and Colonies.

The associated societies had remodelled themselves, and the Institute was doing the same.

Mr. C. F. Ward, F.R.I.B.A. (Newport Borough Architect), gave "The Visitors," and Mr. J. M. Broadfoot, president of Newport Master Builders' Association, in reply, said that, while the architects had ideals, the contractors had to educate the craftsmen. It was a psychological problem they had to deal with. The contractor had to instil into the workmen the spirit of workmanship.

Mr. Ivor Jones, A.R.I.B.A., hon. secretary, S.W.I.A., also replied.

CHADWICK PUBLIC LECTURES.

The "Bossom Gift Lecture" was given at the R.I.B.A. on March 30 by Dr. R. E. Stradling, Director of Building Research. Mr. Alfred Bossom, F.R.I.B.A., occupied the chair.

Taking the construction of walls as the central theme, the lecturer described the progress of building from pre-Roman times to the present day. First, possibly, a rough shelter from the weather was all that was wanted; later, considerations of military defence led to the erection of massive walls of earth, timber and stone; then in the Middle Ages architectural design and scientific arrangement of materials began to play a larger part; finally, domestic and trade demands under modern conditions call for good standards of comfort and better protection from the weather. There has been a forced development of building processes under the increasing demands of advancing civilisation. The introduction of new materials, notably, in recent times, iron and steel, has also contributed largely to the changes in traditional methods.

To-day numerous problems confronted the industry. They could be solved to some extent by the old processes of trial and error, but only slowly and at great expense. It was the function of the Building Research Station to assist in their more rapid and economical solution by the application of science and scientific methods. The technical education of the personnel of the industry—the craftsman, the building supervisor, the master builder and designer—was dealt with. It was urged that there was real need for improved scientific education, especially for the building supervisor group. Without this full advantage could not be taken of advances made in scientific knowledge, nor could progressive efficiency be maintained.

The lecturer concluded with a summary, accompanied by illustrations, of the means adopted to meet the modern demands in wall construction, namely, weather protection, suitable external and internal appearance, lasting qualities, economy and cheapness in construction. Some recent building failures and accidents were analysed and the moral drawn that better scientific education would serve as a partial preventive.

Further information about Chadwick Public Lectures may be obtained from the secretary, Mrs. Aubrey Richardson, O.B.E., at the offices of the Trust, 204, Abbey House, Westminster.

INSTITUTE OF DECORATORS.

The annual general meeting of the Incorporated Institute of British Decorators was held at Painters' Hall, Little Trinity-lane, E.C.4.

The annual report was submitted and reference made to the completed arrangements whereby a Lectureship in Decoration has been founded at London University, which will enable students either to take decoration as an optional subject in their course for the B.A. degree in architecture or alternatively to take a diploma course in decoration only. Full details may be obtained from the secretary.

The president (Mr. Godfrey Giles) then delivered his presidential address, in which he referred to the very great loss to the Institute in the death of the past president, Mr. A. S. Jennings. Mr. Jennings was a man of great knowledge with regard to all matters relating to the painting trade, and he was an indefatigable worker for the Institute. His great tact and ability was most useful on many occasions.

With regard to the question of probationers and students, the president had already mentioned the great advantages which would accrue to the Institute through interesting young men early in it. He considered it a very important move, and was only surprised that it had not been started from the very beginning of the Institute. It had now been arranged on the lines of the R.I.B.A. probationers or students. At the conversazione in July last he had intimated that the Council contemplated arranging a debate between this Institute and the Royal Institute of British Architects. Although he did not suggest so at the time, said the president, he felt in his own mind that this was a rather daring proposition and certainly quite unprecedented, as it was difficult to foresee how architects would meet the proposal. Fortunately, they welcomed the idea, and he thought the general opinion now was that the meeting was a great success, and even the forerunner of other similar events. Mr. Guy Dawber, A.R.A., past president of the Royal Institute, honoured the Institute by opening the debate, and afterwards said that he would arrange for another meeting where the Decorators would be the guests of the Architects, as he felt that such an exchange of views could not fail to do good. It was, said the president, well worth considering whether similar debates could not be held with advantage in the provinces.

During the past year the Council was negotiating with several British Universities with a view to establishing in their curricula schemes of instruction in decoration. This was referred to in the annual report, and he hoped that the result of that phase of their activity would produce an excellent result, as in the future architects and decorators would be brought together at the student stage. Arrangements which had been come to with the London University necessitated the raising of considerable funds, and although it was hoped that assistance might be obtained from manufacturers and others interested in the decorators' craft, it would be necessary, according to the old motto that charity began at home, for the subscription list to be started by members of the Institute.

There was one more matter to which he would like to call the attention of members, and that was the way in which the Institute was at last showing signs of growth in numbers, and he hoped, therefore, in influence. Numbers of the members had increased by 39 since January 1. Since September last there had been 55 new members.

BRISTOL CLERKS OF WORKS.

The annual dinner of the Bristol branch of the National Federation of Clerks of Works and Builders' Foremen, was held at the Royal Hotel, Bristol, about 120 being present. Mr. F. N. Cowlin presided, and was supported by the Lord Mayor, the Sheriff, the President, Mr. A. J. Sprague, the President-elect, and Messrs. C. Wills, E. M. Walters, W. Coole and E. Averden. Mr. J. W. Maslen, proposing the toast of "Architects, Builders and other Visitors," said that if architects and builders were flourishing, the clerks of works and builders' foremen would not have to complain. He thought it was a very happy occasion which brought together all sections of the building and allied trades. Mr. H. E. Todd, A.R.I.B.A., responding, referred to the spirit of craftsmanship that existed in the 18th century, and said they should try to recreate that spirit. His association, the Wessex Society of Architects, felt that the time had come when a civic survey of the city should be undertaken. In Bristol there were unique examples of 18th century architecture that should be preserved from vandalism. Mr. E. M. Walters also responded. Responding to the toast of the "Bristol Association," Mr. A. J. Sprague dwelt on the good feeling that existed between the architects, builders and kindred trades and the Association. The aid given to the Benevolent Fund was greatly appreciated.

WESTMINSTER ABBEY

IN a further lecture on English Mediæval Architecture, at the Central School of Arts and Crafts, Sir Banister Fletcher, F.S.A., F.R.I.B.A., dwelt upon the national monument and burial-place, the Abbey Church of St. Peter, at Westminster. He gave the history of the Abbey and its monastic buildings, and showed how intimately it was connected with the history of kings, heroes, monks, and people of all sorts and conditions. He briefly described all that could be gleaned about the Confessor's church, the pioneer example of the Norman style in England, and proceeded to outline the story of this great coronation church with Henry III 's monumental choir, sanctuary, and transepts—specimens of almost unequalled beauty of the Early English style in its later development, as introduced from France. The lecturer then described the monastic buildings, which formed the scene of the domestic life of the Benedictine monks who for several centuries lived and died here. Finally he sketched a vivid picture of the latest product of the Gothic style, Henry the Seventh's Chapel, with all its richness of panel and pinnacle and its marvellous pendant vault—a masterpiece of English masonry like a cobweb in stone.

THE BUILDING TRADES EXHIBITION

A COMMENTARY AND A FORECAST.

The Building Exhibition (of which the fifteenth of the series opens at Olympia on Friday next, April 13), is always a practical business exhibition, which accounts largely for its continued success and popularity. It appeals directly to the specialist — the architect, the builder and contractor, the surveyor, the engineer, and, indeed, all who produce, handle, specify, or use building materials of any kind whatsoever. It has no side-shows or attractions artfully conceived to entice flocks of mere sightseers, and this is perhaps one of its principal virtues, for the mere sightseer is the last person whose patronage is desired, either by the promoters or the exhibitors.

Its main purpose may be said, briefly, to be: (1) the presentation of a comprehensive array of all classes of building materials; (2) to record progress in the design and invention of such materials; and (3) to stimulate their consumption. In satisfying these requirements it has achieved notable success. But though the Exhibition is essentially one for the expert, it appeals also to the layman who has an interest in building, and to-day, with the tremendous post-war increase in private house ownership, such interest is greater than ever before. Whatever the degree of his obligations, the building owner may always learn something from the Exhibition. The problem of damp walls; of leaky roofs; of dry rot; of smoky chimneys; of leaky taps; the right selection of decorative materials, furnishings and equipment—these and a hundred-and-one other difficulties of upkeep and repair are the regular concern of the building owner, and in the Building Exhibition he can find their practical solution readily and conveniently at hand.

The social side of the Exhibition is also important, providing, as it does, an opportunity for friendly meetings and reunions; and then there is the series of visits by the various architectural and building societies and institutions. We give a full list of these fixtures below, and in passing would draw attention to an important and pleasant innovation this year, namely, the entertainment to dinner of members of the Architecture Club by the promoters of the Exhibition. A special feature of this year's show which is sure to attract a good deal of attention is an Architects' Loan Exhibit of *objets d'art*. Here will be found many fine antiques, as well as specimens of modern furniture designed by members of the profession.

Coming to a consideration of the building exhibits, it is now possible to state that this year's show will be the largest and most comprehensive of the whole series. The Main Hall, the New Hall, and the Main Hall Gallery will be entirely filled with high-class exhibits of wide variety and interest. As the Building Exhibition is held every two years, it is not likely that we shall see any startling innovations, though the majority of the stands are certain to display improvements in familiar materials and methods, and for this reason alone the Exhibition will be worth a visit by all who are interested in securing better and cheaper building work.

We have now definitely emerged from that post-war period when any kind of system of building or substitute material, no matter how impracticable, could plausibly proclaim itself to be the solution of all our building troubles, and rely upon receiving serious consideration. Many of these systems and materials have disappeared, without any loss to the community at large. Some, however, have fully established themselves, and they will find their due place in the forthcoming Exhibition. Generally speaking, however, it may be claimed that traditional building materials have well held their own, in spite of strenuous competition, and thus we shall find at Olympia what we have always found in the past—an impressive display of bricks, slates, and tiles of various kinds, many showing improvements in manufacture, as well as an excellent showing of constructional and decorative timbers, stones, marbles, and granites. At the same time, all the various materials which were once called "substitute," but by the tested excellence of their quality have firmly established themselves as "standard," will be well in evidence. Asbestos-cement tiles, slates and sheets, bitumen specialities, partition materials, slabs and building blocks of various kinds are among the many alternative building materials that have come to stay, and they will be fully represented at Olympia. Another new material that is being increasingly used on important building jobs is cast stone. It has great crushing strength and durability, and experts do not conceal their belief that it has a great future before it.

Stoves, ranges, and mantels will be well in evidence, and it will be seen that attention is being increasingly devoted to the questions of efficiency and cleanliness, the introduction of rustless steel, with which everybody is now familiar, being a typical instance of the trend of modern labour-saving invention. One novelty this year will be an exhibit of domestic coke grates and coke fires for living-rooms, inset or independent, for standing in front of existing fireplaces. At the same time, the makers of other types of apparatus will show the possibilities and advantages of their own particular methods of providing heating, lighting, and hot-water supply.

In the sphere of internal and external fittings, such as decorative ironmongery, doors, fireplaces, joinery, metal windows, etc., we shall see the continued effect of the tendency towards standardisation, which is by no means a bad thing when the question of design receives proper consideration. Manufacturers, largely owing to the influence of the architect, are now fully alive to the importance of good design in the details of equipment, and Olympia will show that mass production and comely design are no longer incompatible.

Sanitary equipment has always been a strong feature of the Building Exhibition, as it will be this year, with a great variety of exhibits of the latest types of baths, basins, lavatory fittings, and so forth. The tendency for these fittings is more and more towards elaboration and richness of effect. Real marble is a costly material, though there is a considerable demand for it in connection with sanitary equipment; but to-day it is possible to obtain fittings made of synthetic materials which have all the richness of effect associated with natural materials such as marble at a good deal less than their cost. At the same time, less ambitious requirements are suitably provided for in more conventional materials, such as glazed ware and enamelled iron. Paints, varnishes, and enamels will also be on view in their customary profusion, together with the other manifold varieties of decorative materials.

For the contractor there will be a comprehensive array of machinery and builders' plant of all kinds, ranging from woodworking machines for carrying out a great variety of operations to patent systems of scaffolding. In these days, when economy is a vital factor in building operations, the progressive contractor must keep abreast of all inventions that increase production and efficiency, and the Building Exhibition always provides an opportunity for keeping in touch with the latest developments in such mechanical and other appliances. Various brands of cement will be on view, including those products indispensable to constructional work where speed is essential—the rapid-hardening Portland and the aluminous cements, both of which are quickly growing in favour. The applications of white cement for decorative and textural effect will be shown, and the possibilities of colour in concrete demonstrated. A variety of exhibits such as a concrete window-frame, a fireplace, bricks, roofing tiles, etc., will show the numerous purposes to which concrete is capable of being adapted.

An interesting exhibit will be that of the Empire Marketing Board and Department of Overseas Trade, arranged in conjunction with the Imperial Institute, and consisting of a display of structural and ornamental timbers from our Overseas Possessions, for which it is hoped to create or increase a demand. Another exhibit which will arouse special interest will be that of the Building Research Station at Watford.

This year, also, there will be an exhibit of great interest from the educational point of view, the L.C.C. Hammersmith School of Arts and Crafts, the L.C.C. School of Building, the Polytechnic School of Architecture, Building and Surveying, the Willesden and Northern Polytechnics, the County Borough of Southend-on-Sea Municipal School of Arts and Crafts and School of Architecture all contributing to it with drawings of architecture and building construction, together with examples of craftwork.

One thing we are especially glad to note about the forthcoming Exhibition is that a large number of the stands have been designed by architects. The practice is to be commended, for there is no better way of displaying the practical and æsthetic qualities of a material or fitment than by showing it embodied in a building of real architectural quality. Another matter may here be appropriately referred to. In past years the suggestion has been made that the Exhibition might be improved by a more formal lay-out and by grouping the various classes of exhibit. At one time we ourselves were somewhat of this opinion, but experience has shown that the present arrangement of the Exhibition is really the most convenient for the purpose in view. The exhibitors themselves do not favour grouping, nor do the great majority of visitors, who find that dispersion of the exhibits obviates any possible cause of embarrassment. Exhibitors, moreover, like to retain the positions they have occupied in former years. Hence we feel that the promoters are wise in retaining the present form of the Exhibition.

In a brief survey such as this it is not possible to do more than roughly indicate the extraordinary variety and appeal of the Exhibition. A detailed consideration of the individual exhibits must be reserved to our two succeeding issues, which will contain, in addition to their normal features, many contributions and illustrations directly and indirectly relating to the Exhibition.

List of Fixtures.

Saturday, April 14.—Association of Architects, Surveyors and Technical Assistants.

Monday, April 16.—Society of Estate Clerks of Works. Visit of Lord Mayor, Lady Mayoress, and Sheriffs.

Tuesday, April 17.—Worshipful Company of Tylers' and Bricklayers' Dinner.

Wednesday, April 18.—National Federation of Clay Industries.

Thursday, April 19.—Institution of Sanitary Engineers. Architecture Club Dinner.

Friday, April 20.—London Master Builders' Association.

Saturday, April 21.—Incorporated British Institute of Certified Carpenters.

Monday, April 23.—Institution of Structural Engineers.

Tuesday, April 24.—Southern Counties Federation of Building Trades Employers.

METHODS OF RADIANT HEAT

At the Royal Society of Arts, recently, a paper was read on this subject by Mr. Arthur H. Barker, B.Sc., B.A., M.I.E.E., Uh.Sch. Professor A. E. Richardson, F.R.I.B.A., Professor of Architecture, University College, London, occupied the chair.

It is a commonplace of physical science, said the lecturer, that heat energy was transmitted from one place to another by three physical processes—by conduction, convection and radiation. It was probable that these three were ultimately the same. It might be said that:—

(1) Conduction was the process by which particles of a solid body became heated from hot adjacent parts in so-called contact with them.

(2) Convection meant the carrying of heat by relatively hot molecules of a fluid floating into contact with relatively cold particles of another body.

(3) Radiation was the process of conveying heat by rays travelling in the ether like rays of light.

We had to inquire how, and in what form, we could introduce radiation into any building and what were the different practical means available. Generally we could divide the methods into two classes, one high temperature, or incandescent, methods, and the other low temperature, or distribution, methods. The former consisted in maintaining some radiating body at a high temperature at which each point of the hot surface gave off a beam of rays. Such a beam was of a number of different wave lengths extending far down into the infra red, and in such a beam infra red rays carried the most energy, though the luminous rays, from the green downwards, were of importance. The other class, or low temperature methods, in which the radiation was produced from a larger area of surface maintained at a much lower temperature. These surfaces were exposed to the interior of the room and gave off beams of rays, all of which were in the infra red region; that was to say, the beam they gave was entirely non-luminous and invisible.

It was found by experience that radiant heat of this character could be utilised to make a room comfortable at a much smaller expense of energy than when the radiation was of a luminous character. The reason probably was that glass was much less diathermanous to rays of longer wave length, and much more so to waves of shorter length. Thus a large part of the heat when introduced as luminous waves passed through the glass of windows and was lost. Also wall surfaces would absorb a much larger proportion of the luminous heat impinging on the walls of a room, but heat was absorbed by the surfaces, and was rapidly conducted to the outside, and was lost in the outer air, whereas a much greater proportion of the dark heat would be reflected back into the room. Such was the difference in effect. He did not think that it was possible for anyone to distinguish by sensation incandescent heat from the dark variety.

The sensation effect of a given intensity of radiation on the skin was probably the same in all cases irrespective of wave lengths, although of this fact he was not absolutely sure. It did, however, appear probable that the physiological effect of light and dark heat must be different. It was probably that the bright heat was more physiologically advantageous than was the dark heat. That was a question on which he was not competent to pronounce from his own knowledge.

The incandescent method essentially required some highly concentrated supply of energy in the form either of solid fuel or of gas, oil or electricity. By any of those means it was possible to produce the incandescent effect which was required. Those methods might roughly be divided into two classes, of which the first consisted of the emission of radiation from the burning fuel direct, such as the coal fire. The second method consisted in the heating up of some material of a high emissivity, which could be raised in temperature directly or indirectly by the combustion of fuel. The necessity for this latter method arose from the fact that the energy of combustion of some fuel was very largely carried off in a convective manner. Thus, a mixture of gas and primary air emitted very little of the energy of combustion in the form of radiation, but when this gas flame was allowed to impinge on material such as fire-clay, it was raised to incandescence and gave off a greatly increased part of the energy in radiant form.

Electric power was similar. If one were to raise a coil of, say, nichrome wire to incandescence by means of an electric current, the amount of energy given off from it in the form of radiation would be relatively small, but if the coil was enclosed or enshrouded by fire-clay in close contact with it, the fire clay itself became incandescent and the amount of radiant energy was greatly increased. For countless years methods of heating by incandescent radiation had been in use, of which the oldest, and by far the commonest, was the old open coal fire, which allowed the greater part of the convected heat to escape up the chimney with the smoke and distributed the remainder, in the first place and in the main, in the form of radiant energy. This method, many as were its advantages, was, of course, about the crudest and most extravagant that could easily be conceived. The device for economising that fuel by enclosing an open fire in a casing and calling it an anthracite stove entirely transformed the character of the heat obtained. The radiant heat from the fuel was absorbed by the walls of the stove, which was thereby heated and distributed about 70 or 30 per cent. of the heat in convection currents. The remainder was radiated at a low temperature. Some slow combustion stoves had a very high efficiency, indeed, 90 per cent. being not unknown. That open fire process had been improved in efficiency, convenience and economy, by extracting from the solid fuel a gas of which the advantages were that it was readily carried to the point where it was to be burnt and that its combustion left no solid residue, and that the rate of combustion could be regulated by a tap. Those are very great advantages. Functionally the effect of a gas fire was identical with what has been already described. There was no difference between the physical effect of heat from a coal and a gas fire properly fitted with a suitable flue. The idea that a gas fire provided drier radiant heat than a coal fire was merely absurd. Given the same chimney, the only real difference between them was the attractive and capricious variability of the one and the controllable constancy of the other.

Gas could also be used for the local production of luminous radiation, but not without the generation of a corresponding amount of convection. The type of apparatus known as the bowl fire now becoming fairly well known was extraordinarily useful in certain circumstances. This appliance had an incandescent mantle at the centre of a large hemispherical copper reflector. It distributed approximately 45 per cent. of the energy of the gas in the form of a beam of radiation which could be transmitted over considerable distances through a room as the beam was only slightly divergent. It was possible with three or four of these appliances at the corners of a large cold room to direct a beam of heat on a person sitting in the centre of the room in such a way that he would feel perfectly warm. The drawback of their use was, of course, the generation of the products of combustion which fouled the reflector and which must either be allowed to mix with the air of the room or be got rid of somehow. A more desirable though more expensive type of similar character was the electrically operated bowl fire, which for certain purposes provided a very desirable type of local luminous radiant heat.

When they were used in the manner described above a person could be kept in complete comfort in a dead cold room by directing beams from two or three of these heaters on his body from a distance. Even a perfectly naked person in an absolutely cold room could be kept quite comfortable. The ordinary electric fire did not usually distribute more than from 40 per cent. to 70 per cent. of its heat, according to type, in the form of radiation, the remainder being convection. They were too well known to need further comment.

Most of the other heating stoves were largely convective in character. A type of electrical fire now becoming rather well known was a clever imitation of a coal fire, being so arranged to present a similar appearance. Reflectors were arranged to radiate a certain amount of heat from the front. Though very desirable in certain positions in well-to-do homes, they were expensive both in first cost and in current consumption, especially if any considerable amount of heat was required. Functionally, they provided a mild beam of radiation of which a relatively large proportion consisted of light-giving rays. They were often so placed that a considerable portion of their heat was wasted as far as the room warming was concerned. They should never be placed under a chimney. Only about 30 per cent. of the heat given off was radiation, the remainder being convection.

Turning to the consideration of the appliances giving dark heat:

The essence of this method was to maintain exposed to the room interior a large surface at a medium temperature, usually not exceeding 20 degrees, but which in some examples was very much higher. About 60 per cent. of the heat given off from such a plate was usually in the form of radiation and in some cases, he believed, much more, depending on the movement of the air in contact with the plate. There were many disadvantages in maintaining a high temperature, both because of the danger and of the unpleasant character of the heated air it gave off, due to charring of ammoniacal dust particles; also on the score of economy. Any given amount of heat spread over a large surface at a low temperature was much more effective in producing a feeling of comfort in a room than if the same amount of heat was spread over a smaller surface at a higher temperature. Thus there was (as was very often the case) a conflict between first cost and economy of upkeep. The higher the first cost the smaller was the cost of upkeep for the same heating effect. The principal advantages of this radiant method were that it dispensed with the feeling of stuffiness which always existed to a greater or less extent when the means of transmission were purely convection, and which formed the principal obstacle to the general adoption of central heating. The second and outstanding advantage was that a large reduction on the cost of heat was effected by it. He believed that the convection type of heating would be carried out in future only in places where it was necessary to distribute the heat in complicated chambers. One of the drawbacks was that the effect of the hot surface was diminished in situations where an unobstructed view of the heating surfaces was not obtainable. If the hot surface was out of sight its effect was a good deal reduced. This implied that more heating units were necessary than would be required with convective structures, which tended to increase the first cost. Where the heating surface was placed on the ceiling it could hardly be obstructed by furniture. It was, therefore, likely that in future much of the heating would be done by surface of this character fixed on the ceilings, though this position had also its disadvantages, especially the danger of damaging tables and other furniture placed immediately below, and the floors immediately above.

The methods that had been evolved were numerous. The first method used in practice was, he believed, originally conceived by himself during certain experiments made in his

own house. There were two rooms side by side of about the same size, of which one always felt warm and the other relatively cool when the thermometer temperature was the same. He found this was due to the circumstance that the average temperature of the walls of the one was several degrees higher than that of the other owing to the presence of certain flues in the wall, which increased the feeling of warmth without considerably raising the temperature of the thermometer. He therefore conceived and patented the idea of warming the walls directly by burying small hot-water pipes in the plaster, through which hot fluid could be circulated. The heat of the fluid was thereby transmitted by conduction through the pipes conveying it, and through the plaster to the surface which thereby became warm.

Various practical methods of accomplishing this result had been developed since that time. Originally it was proposed to cast the pipes in a separate slab of special plaster material of a quality which would not crack by the heat, to be built into the wall. Afterwards it was found practically possible and more convenient to cast these slabs in position on to the wall by first putting up the coil connecting it to the circulating pipes and covering it with the plaster. The drawback arising from this alteration was the difficulty of avoiding a cracking of the plaster unless the temperature of the water was kept very low. Many different kinds of plaster had been tried, and even at present a wholly successful solution to this problem had not been found. Later, with the development of concrete buildings and concrete floors, came the proposal, which had been extensively used, to cast ready-made steel coils in the concrete of the walls or ceilings, especially the ceilings, the pipes all being welded together and completed before the concrete was cast. Thus the pipes became firmly imbedded in the concrete, and any hot fluid passing through them would have the effect of heating the mass of concrete and producing a warm building without unduly heating the air.

It was evident that when coils were completely concealed in the structure of the building it was a more difficult matter either to keep track of them to repair, or to increase, or to reduce them in size, or cut them out of circuit, or to clear them if they became stopped up, or to alter them in any other way when the building was altered, than if the pipes were all exposed and accessible. Efforts had been made to obviate some of those difficulties of embedded coils by applying the heat to the ceilings or walls in other ways which would not involve embedding the pipes and soaking of the heat in the structure where it was undesirable. One method of recent introduction had been to form the warm panels in the shape of a large flat surface of cast, or wrought, iron on which were formed the conduits for the conveyance of the hot fluid. The heat of the fluid passing through this conduit communicated its heat to the metal which spread out over the plate until the whole of the surface was warmed. This had an advantage over the plaster coil that the entire panel could be removed without damage to the structure and replaced after having received any attention that it might require, also that it could be served by water or steam at any temperature without fear of producing cracking of the structure. The disadvantages of it were that provision had to be made for supporting the panels, which were often of considerable weight. They were fixed either on the ceiling or on the wall by screwing them to specially made brackets bolted in appropriate positions to the structure. It was not always easy to conceal the pipes serving the panel. For this purpose a special dummy plate was sometimes made to cover up the connections.

In cases where economy was of greater importance than artistic appearance the panels might be bolted direct on the wall or ceiling and left exposed without any kind of concealment. In the opposite conditions where complete concealment was of importance, the panel was let into a recess formed in the wall or ceiling. The panel was provided in the form of a perfectly flat plate, the face of which was fixed flush with the wall or ceiling surface, or, if not absolutely flush, it might project slightly in the form of a panel which might be arranged as a part of the decorations. It might then, if desired, be covered with a thin veneer of metal, or otherwise, which should be flush with the wall. The edges might be confined by a beading or frame, or otherwise. In other cases the panels were formed as a complete, or partial, dado round the walls. The plates were cast from patterns made like an ordinary oak dado, in which oak graining had been incorporated, so that when suitably coloured they had the exact appearance of genuine oak; indeed, it was impossible to distinguish them in appearance from ordinary panelling made of oak or other wood. The master patterns were actually first made in genuine oak. They were then treated with a sand blast, which had the effect of cutting out the soft parts of the wood between the hard veins, thus emphasising the graining. Iron patterns were then cast from this wood pattern, which were again used from which the final castings could be cast in large numbers, each bearing the exact appearance of the oak graining of the original wood pattern, and which was very much cheaper than real oak panelling. Naturally in the mass production of castings an oak pattern would soon be destroyed. The effect produced by the iron patterns was exactly similar. The metal panel also lent itself to use which would probably become very general, with gas or electricity as the heating medium. A gas flame was arranged behind the panel, which would supply heat all over the plate. The products of combustion were sucked through the conduits by a small extract fan which withdrew them and discharged them to the outside. By this means the panel was warmed all over, the same effect as when heated by water or steam. In a similar manner the passages in the panel could be supplied with electrical coils through which a current of electricity from the power mains would generate the necessary heat which was distributed by the plate all over the surface.

The effectiveness of this form of heating made possible heating by gas or electricity in many cases where the expense of convective heating would be too great. This rendered possible the central heating by gas, especially of buildings where no flues were provided and without the products of combustion contaminating the air of the building. Automatic devices were supplied by which the gas was turned off if the suction failed so that there might be no danger of escape. This application had also the great advantage that the whole of the gross heat in the gas was employed, that was, the products of combustion on reaching the fan were generally absolutely cold, so that no heat was thrown away in the products. This effects a very large reduction in the cost of heating a building of any size without a boiler-house, and without the trouble of carting fuel and ashes, and made possible the heating of a building by gas at a cost of about half the usual cost of heating by gas and which did not greatly, if at all, exceed the cost of heating by hot water radiation. It was certainly immensely below the cost of heating to an equal degree either by open coal or gas fires. Similar results could be obtained by enclosing in the conduits electrically operated coil which in the same way distributed the concentrated heat derived from the consumption of electrical energy over the whole of the plate and enabled all the room to be heated electrically at about half the cost of heating by ordinary electrical radiators.

Other means which had been adopted to secure a similar end had been to cover recesses left in the wall and fix steam coils covered in with a sheet of iron or other metal. In this case the heat of the steam pipe which would be very objectionable and even offensive in a room on account of the burning effect of a high temperature surface on the air heated directly by the coil was confined and diluted in the space covered by the steel plate, and was transmitted to the room at a low temperature. Other methods of warming panels by means of electrical energy had also been introduced. Similar effects had been produced by textile means in which a continuous wire was inwoven with the cloth, the wires being the warp and the wool or silk the weft, and electrical current passed such a material, when in good order, causes the cloth to be uniformly hot all over. It was commonly used for pictures and seats of chairs and the like, or screens. It had the advantage of lightness and portability and the disadvantage that a possible fracture of the electrical conductor might occur, in which case naturally the current would be cut off. There would also be the danger of a user receiving an electrical shock if anything went wrong with the terminals or connections.

Radiating surfaces of several unique kinds had been, and were being, made. One of the most notable was the heating of large glass mirrors by the insertion of an electrical resistance circuit behind it which warmed up the glass and produced the same effect. Similarly, metal plates had been treated by fixing to the back of them electrical coils of suitable resistances, and whereby the plate was warmed uniformly all over. The methods of carrying out this principle involved the heating of the floor by various means. This method was not strictly what was meant by radiant heating. It was, perhaps, a combination of all the three agencies—conduction, convection and radiation—though it was difficult to lay down a proportion between them. It was a great difficulty, well known to heating engineers, that in an otherwise well-warmed large building or hall, such, for instance, as a theatre, or cinema, even though the space as a whole was well warmed by convection methods, the floor was apt to be very cold, especially under the seats. The audience in such places frequently complained of cold feet when the general temperature was so high as to be stuffy, especially at the gallery level. This was one of the most pronounced examples of the disadvantages of heating by convection, and was a direct consequence of the inherent defects of that method. Continental engineers, and to some extent British ones also, had attempted to overcome this defect by withdrawing the extract air through gratings underneath the seats where these were fixed. This, at any rate, ensured that a certain amount of warm air should find its way to the central parts of the floor.

The general method of floor heating was in use many centuries ago. It was certainly known in Roman days, when houses and baths were sometimes heated by forming flues under floors and in the thickness of the heavy walls of the buildings of those days, which were heated by basement fires. This method, excellent though it was, fell into disuse, and was probably not thought of for the next thousand years or more. The general principle was revived some years ago in a slightly altered form, and had been used, among other buildings, in Liverpool Cathedral. One method of its application was to heat air by means of stoves of different kinds and force it, by fans, through long flues extending the whole length or width of the floor area to be warmed, whereby the temperature of the floor was raised. It was not possible nor desirable to force the products of combustion through these flues, firstly, because of their high temperature, and, secondly, of the tendency in course of time to accumulate soot and flue dust, which was difficult to remove. Even air was not an ideal medium for conveying heat, because of its relatively low specific heat compared with its volume. A large amount of air had to be forced through at a high velocity in order to convey an adequate quantity of heat, and the temperature was apt to fall in a marked degree from one end to the other of the flue which involved a difference in temperature over the area of the floor. Any temperature higher than perhaps 65 or 70 degrees on the surface of the floor became very uncomfortable for the feet, while if it was below 60 degrees it was not of much use for heating. Hence the limits were very narrow.

Another, and in some respects a better,

method was to provide hot water pipes under the floor in shallow trenches filled with sand and covered with concrete or other slabs, which might be made more or less removable for access to the pipe if and when such access was found necessary. This method sometimes involved difficulties in venting the pipes, which were apt to become air-locked. The method, too, was subject to the disadvantage that if the floor was covered with wood blocks, those situated immediately over the pipes were apt to shrink under the influence of the heat and become detached. This method had been frequently used in open-air schools and sanatoria and like buildings, where very free ventilation was necessary. The principal disadvantage of the method was that it involved considerable cost in builder's work, and that a repair or adequate inspection of the system involved taking up the floor, and this was a disadvantage of all systems which involved the incorporation of any pipes or any part of the heating plant with the structure itself.

Most of the difficulties involved were æsthetic ones, and arose in consequence of the increased attention given to appearance in modern buildings. The modern radiator and pipe, though of immense value in central heating, were not articles whose inherent beauty would lead to their inclusion in any scheme of decoration. On æsthetic grounds it was very desirable that a building should be heated without the source of the heat being visible, but heat could not be conveyed without pipes or flues. If these were hidden, and had to be inspected or altered, the consequent difficulties were obvious. There were very few kinds of working apparatus of any kind which would operate without some kind of attention, reconditioning or alteration, for a long series of years. Our improved methods often involved increased difficulties in maintenance and repair. In practical applications we had to ask ourselves what would be the position of affairs at the time, which was certain to come sooner or later, when a thorough overhaul or repair of the whole system became necessary. We might, in some cases, comfort ourselves with the reflection that this necessity would not arise in our time, but it did seem that due weight should be given to that consideration.

EXHIBITION NOTES

Pictures of glowing colour in and about Tangier are on view at Mr. W. B. Paterson's gallery in Bond-street from the hand of Dick Jansen, a Dutch artist, who was born in Tangier. The realisation of the colour and the broad characteristics of Moorish architecture are strikingly realised, and the artist has certainly produced some remarkably rich effects, as in the Gate of Medensa, Morocco (29) and the Gate in Morocco (11). This artist gives a general impression of truthfulness, but there is no real drawing of architecture in his pictures. An innovation of the usual framing method is to be seen in these decorated frames which were all made in Tangier; in some cases the decorative colour on the frames is a distinct advantage, but on others the result is doubtful. But the general appearance of the pictures in their frames is decidedly decorative. This is the painter's first exhibition in this country, we believe.

It would seem difficult to find a reason for the pictures and drawings now on view at the Beaux Arts Galleries. The exhibits by M. Fabian Ware indicate a knowledge of form and colour and a sense of decorative values, but the work by the Seven and Five cannot be said to inspire or elevate what they were produced for. Perhaps the public may find out.

The present is the 189th exhibition of the Royal Water Colour Society, and it is a good one. There are many drawings which one may dwell on with pleasure. Subjects of architectural interest include Nos. 10, 18, 33, 58, 68, 89, and 124. The last-named is an admirable sketch of Rheims by W. L. Lee-Hankey, and expresses well the spirit of the design.

LEGAL QUESTIONS WE HAVE BEEN ASKED

By W. T. CRESWELL, Barrister-at-Law, L.R.I.B.A., Associate (late Fellow) Surveyors' Institution, etc.

XIV.—WHEN IS A CONTRACTOR LIABLE FOR DEFECTS?

It not infrequently happens that after building works are apparently satisfactorily completed and actually paid for, that very obvious and serious defects appear in the structure, the necessary remedies demanding great expenditure.

So often, too, it is discovered on examining for the cause of the defects, that either the materials used or the labour employed, is found to be other than those specified in the contract in question; and perhaps that certain materials specified are omitted altogether.

If the employer has, himself or through his architect, supplied or selected any particular materials, no liability attaches to the contractor for any defects found at any time therein. But if the contractor is found to have obtained and fixed other materials (whether the latter are reputedly inferior or better than those selected by the employer), for any defects arising the contractor is liable to the employer.

Maintenance Clauses.

Generally, however, the liability of a contractor to make good defects is determined by some maintenance (or other) clause in the contract. If there is a maintenance clause then the contractor's liability generally ends with the maintenance period, except in certain instances dealt with hereafter.

When the contract gives power to the architect, at his discretion, to order the removal or renewal of any materials or labour he condemns during the course of the works, and he has seen the work in progress, and the materials used and labour executed, but has not ordered the re-execution of the defective work in the renewal of the materials he cannot continue to exercise that power in relation to defects discovered or notified after he has given his final certificate, unless there is sufficient ground or suspicion that the contractor of a set purpose and fraudulently, put in materials and labour which the architect could not reasonably have seen whilst exercising reasonable supervision.

When the contractor has received the architect's certificate of satisfaction his liability ends. Of course, further, if the employer can maintain an action for misconduct and collusion amounting to fraud as between the architect and the contractor in respect thereto, then he can claim damages against both.

If, again, the contract has no maintenance clause and does not in any way limit or define the contractor's period of liability, he would appear (subject to what follows) to be liable indefinitely.

When there is a maintenance period it will apply to any defects discovered within that period, even though the *cause* of the defect is not discovered until after the maintenance period has expired.

Effect of Final Certificate.

Unless the contract makes the final certificate of the architect inclusive of satisfaction, and sets a limit to the time during which the contractor is to be liable for defects, the employer is not disentitled to damages for defects by the failure of the architect to discover them; and if payment has already been made to the contractor for the contract work, the employer may sue him for damages in respect of the defective work. However, generally speaking, it is very difficult to hold the contractor liable for any defects whatever once the maintenance period is ended, the custom being immediately before or at the expiration of the period, for the architect to send to the contractor a list of defects for his remedy. The contractor naturally assumes that having put all these items in order he is freed. However, if at any time during the maintenance period, or before, any particular defect has been pointed out to him and has not been included in the final list of defects, he is still liable for that defect until remedied.

Approval of Work.

When the contract provides that the work should be done to the approval of both the employer and his architect, and they have both expressed their satisfaction, the employer cannot recover from the contractor for any defects subsequently discovered or arising.

If work is under the contract to be done to the approval of the employer alone, the contractor can recover payment if he can show that the approval ought not to have been withheld. In this connection payment by the employer direct would therefore appear to imply approval by him, and would prevent the employer from proceeding against the contractor in respect to any defects he discovers or alleges later.

Acceptance of Work.

The acceptance of work by an employer does not, of course, give freedom to the contractor from liability for incomplete or inferior work, nor does his final payment, if at the same time or earlier he has known of and has notified the contractor of defects.

In general, lapse of time (except when Statutes of Limitation apply) does not absolve a contractor from liabilities in respect to defects which he refuses or neglects to remedy before or during the maintenance period; his liability for them continues until he does remedy them.

Effects of Payments.

Payments on account, being subject to adjustment on the final account, do not free the contractor from liability for defects, even if those payments were made by the employer at a time when the latter knew of the existence of the defects.

The contract may provide that the architect's final certificate shall not prejudice the employer's rights under the contract; in which case the latter may recover for defects within the terms of the contract.

Prices of Building Materials.

The report of Major J. W. Hills, M.P., chairman of the Inter-Departmental Committee appointed to survey the prices of building materials, was issued recently (Stationery Office, 4d. net). The report states that the downward movement of the prices of building materials was accelerated during the six months ended last November. In most districts the prices of many types of common bricks had continued to fall in the period under review by amounts varying up to a maximum of 11s. per 1,000. In Birmingham, Leicester, Edinburgh and Glasgow, however, no decreases had yet been reported Falls were also reported in the prices of facing bricks. Except in Birmingham and in Scotland, English Portland cement had declined by amounts varying from 3s. to 10s. 6d. a ton. The price of the imported product had also fallen, though not to so marked an extent. Some falls were also reported in the price of lime. Other reductions were recorded in roofing tiles, slates, lead (in many cases 30 per cent.), cast-iron goods (13 per cent.), and glazed ware.

WEEK IN PARLIAMENT

Westminster, Wednesday.

Peers' War Memorial.

On the consideration of the report from the Select Committee in the House of Lords' Offices, Lord Crawford said that the fourth paragraph of the report referred to the Royal Gallery and the War Memorial of the House of Lords. The committee had recorded its opinion that designs in connection both with the memorial and with the proposed decoration of the Royal Gallery should be referred forthwith to the Royal Fine Art Commission. As a member of that Commission he said that if the House expressed such a wish, his colleagues on the Commission would do their utmost to be of service. The subject was one of real complexity, and advice had already been offered on several questions connected with the War Memorial. He doubted if his colleagues would be in a position to add anything to their views about the memorial itself, but a new issue would be brought before them arising from the projected decoration of the gallery. That certainly raised points of great interest and great difficulty, because any large scheme of mural decoration must be considered in relation to the scale of the gallery itself, and equally in relation to the two great pictures by Maclise, from one of which the gallery took one of its names. Furthermore, the relation of a large suite of paintings to the war memorial was naturally of great importance.

A Bermondsey Open Space.

On the second reading of the Bermondsey Borough Council (St. Olave's Garden) Bill, Lord Arnold said that under an Act of 1918 St. Olave's Church was to be demolished, only the tower remaining. Half the site of the church and the churchyard were to be vested in the Bermondsey Borough Council, and used as an open space. The other half was to be sold by the trustees, and the proceeds were to be used for the erection of churches in the newly-developed areas of South London. It was eventually purchased by the proprietors of Hay's Wharf. But this so-called open space had become useless for its purpose, and it was now proposed, under the Bill, to sell the second half of the St. Olave's site to the proprietors of Hay's Wharf, who were prepared to buy it for £10,000, the same sum as they gave for the first half. An open space would be provided elsewhere. Hay's Wharf proprietors would erect a building on the half site, but the first floor would be so high that 100 motor vehicles could be parked on the ground floor. The tower which stood on the sixth of an acre was of no real historical or artistic value, and it would be demolished.

The Bill was read a second time.

The Granite Industry.

During a House of Commons debate on the safeguarding of industries, Capt. Streatfeild spoke of the unemployment in the granite industry in the United Kingdom. The trade in granite setts and monumental stone had, he said, been almost entirely taken by Scandinavia. If any help was to be given to the granite industry by the imposition of a duty on imported monumental stone the help would be very little. If the monumental granite industry was to be helped marble must come under the duty as well.

Houses Completed.

Mr. Chamberlain informed Mr. W. M. Adamson that the number of houses completed under the Housing, etc., Act, 1923, during January, 1928, was 2,256, and during February, 1928, 2,684; under the Housing (Financial Provisions) Act, 1924, the numbers completed during the same months were 3,703 and 3,939 respectively. The numbers authorised for erection but not completed by March 1 were 85,298 under the Act of 1923, and 59,194 under the Act of 1924.

The Disfigurement of the Countryside

In the House of Lords, last week, Lord Buckmaster moved: "That it is urgently needed that the Government should take immediate steps to prevent the disfigurement of the countryside by the advertisements of oil companies." He said it was useless to hope to preserve the beauties of our towns. The beauties of architecture and the outlines of the old places were all trampled underfoot, but there still remained some of the villages that spoke with an appeal which it was difficult to put into words. Into those places, however, they now found there had come what he regarded as the very acme of abominable vulgarity, red and yellow petrol pumps of the most hideous kind, desecrating something that was sacred. Why could not the people responsible for these oil advertisements realise that what might be an ornament to the streets of Chicago was out of place among the shadows of the Cotswold Hills?

Lord Hunsdon moved an amendment to bring all advertisements within the terms of the motion. Outside advertisements, he said, ought to be prohibited except under licence.

Lord Desborough, replying for the Home Office, said that with regard to advertisements, the matter at present rested in the hands of the county councils, who had the power of making by-laws and delegating their authority. In regard to petrol, a few years ago the leading oil companies withdrew their roadside advertisements in agreement, but there were still ten companies who were not parties to that agreement. The Government were fully alive to the horrible disfigurement of the countryside by these and other advertisements, and especially by the petrol-filling stations. They had already taken steps to place before Parliament proposals for dealing with the horrors. There was now included in the Petroleum Amendment Bill a provision empowering county councils and borough councils to make by-laws regulating the design and appearance of petrol-filling stations, or prohibiting the establishment of stations. Petrol-filling stations, as defined in the amendment of the Act, included any advertisement in connection with a station. One of the biggest oil companies had under consideration the question of withdrawing all their advertisements at petrol-filling stations, and he was told there was a likelihood of other large companies taking a similar course. As the matter would come before the House in the shape of a Bill, it was perhaps unnecessary to tie their hands now by passing any resolution.

The amendment was negatived and the motion withdrawn.

Unemployed Operatives.

Mr. T. Williams asked the Minister of Health if he was aware that there were 118,000 building operatives unemployed at the present time and that they were receiving approximately £120,000 per week unemployment pay; and, in view of the known shortage of houses in various parts of the country, would he state what steps the Government were taking to supply the necessary houses and at the same time employment for those men.

Mr. Chamberlain said he understood that the number given referred to insured persons recorded as unemployed on February 20 last, and included over 60,000 unskilled workers. With regard to the last part of the question, it was the policy of his department to encourage the erection of houses in areas where there was a shortage, and the considerable fall which had taken place in the price of houses should facilitate the carrying out of building programmes in the future.

The Foundling Hospital Site.

Mr. R. Morrison asked the Minister of Health whether he would withhold his sanction from the proposal to erect a block of flats, 97½ feet high, on the Foundling Hospital estate, in view of the importance of this open space, until the Report of the Royal Commission upon Open Spaces had been published.

Mr. Chamberlain said that the site of the Foundling Hospital, which was understood to be the site of the proposed flats, was not considered to come within the terms of reference of the Royal Commission on London Squares. The London County Council, under the Town Planning Act, had power to permit the erection of the flats referred to, and if they decided to give the permission he had no authority to interfere.

ARCHITECTS' & BUILDERS' INQUIRY BUREAU

We are glad to give questions and answers, but cannot accept responsibility for contributed replies, especially on legal matters.

May we appeal to our correspondents to submit their queries on paper of a size easily filed, and written as cyibly as possible, or, better still, in typewriting?—Ed.

Cubic Capacity.

Sir,—I thank "Member" for the reply of March 2. It appears from this that the R.I.B.A. has found it advisable to make a ruling on this matter. I think it is of such importance that a national ruling should be made and published, so that in dealing with cubic capacity we all know where we are. If the R.I.B.A. would publish their ruling, say, in *The Builder*, of their standard method mentioned by "Member," I should —since there appears to be no other—be pleased to adopt that one, and I imagine for the same reason many others would do the same.

F. Palmer.

Duration of Engagement.

Sir,—A clerk of works was engaged at £6 6s. a week. Is it understood he is engaged for the term of the job, subject to his behaviour, and not upon a usual weekly engagement?

Aerated Cement for Re-fixing Tiles.

Sir,—As I am interested in the correspondence dealing with this subject, and being anxious to carry out an experiment with this particular kind of cement, I should be obliged if your correspondent would say where it may be obtained.

Experiment.

Cleaning Stone.

Sir,—Could any of your readers advise me as to the best liquid preparation for cleaning old stone cornices and carvings (Kenton stone) without injuring the stone?

Bank.

Pozzolana.

Sir,—Can a reader give me any practical detailed information as to the use of a pozzolana for the neutralisation of the traces of free lime in lime mortar, or even in cement mortar, in order to lessen the probability of discolouration, efflorescence and decay on the external faces of a structure?

Weathering.

Adzing

[Reply to "Restorer," March 30.]

Sir,—I would advise your correspondent to get into touch with shipwrights, preferably men of middle age, who have done repairs to small craft. Shipwrights use their adze for all kinds of trimming, and they pride themselves on its neatness, and it saves them labour with the plane. I have seen adzing done equal to work with the jack plane. Their adze is of different pattern from that used by carpenters. I should be pleased to assist your correspondent in finding the right man, as I am in touch with shipwrights.

William Cue.

Barking.

THE BUILDING TRADE

EVERYDAY SCIENCE FOR ARCHITECTS AND BUILDERS—XIII

By A. M. GILES, B.Sc., A.I.Struct.E., A.M.I.E.E.
DIAGRAMS AND ILLUSTRATIONS BY M. R. DUMVILLE.

Change of State.

THIS is one of the effects of heat upon materials, which, although we have left it to the last, is nevertheless very important. In the previous article we have considered the effect that produces expansion and contraction, and also that which produces change of temperature, and it is our aim in this article to talk about the change of state of a material owing to the effect of heat upon it. By change of state is meant the passing of a material from the solid to the liquid condition, or from the liquid to the gaseous condition, and, of course, the reverse.

There is much of practical interest and application in this branch of the subject, e.g., the bursting of pipes when water changes to ice, or the bursting of boilers when water changes to steam, or even the fusion of solder which crops up in plumber's work. It is then quite necessary for us to spend a little time in considering this change-of-state question as one of the effects of heat upon a material. We all know that if we heat ice it will change to water, and if we continue to heat the water it will change into steam, and, conversely, if we cool steam, it will condense

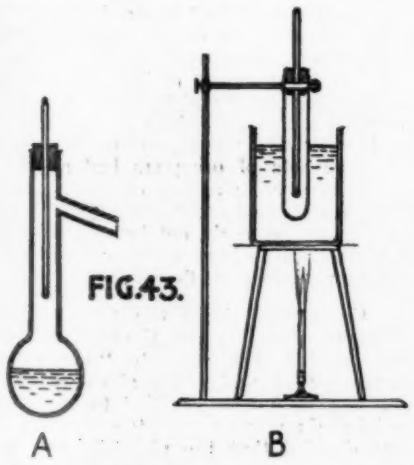


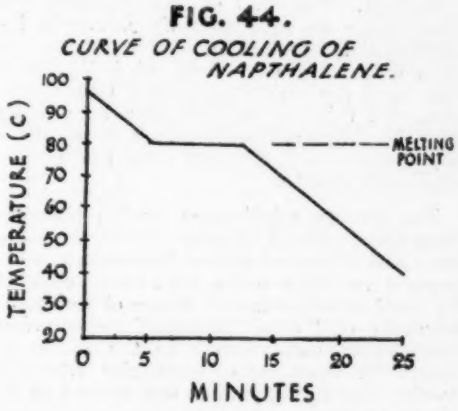
FIG. 43.

into water, and if we continue cooling the water it will eventually freeze. It is quite easy to verify the former part of the above statement, and at the same time to find out at what temperature the change takes place.

Experiment.

Put some pieces of ice in a mug similar to that shown at Fig. 41 C. (previous article). Place a thermometer in the mug so that its bulb is in the ice. The reading on the thermometer will soon be 32 deg. F. Now place the mug on a tripod over a gas burner and heat it very slowly. Use the thermometer as a stirrer and watch the reading closely. Although we are supplying heat to the ice the thermometer still reads 32 deg. F., and will continue to do so until all the ice is melted. This seems to contradict our earlier statement, that a supply of heat will cause a rise of temperature. We, therefore, must look for an explanation. This is quite straightforward, for the heat supplied, while not raising the temperature, is simply doing work by changing the ice into water. This heat, that is absorbed by the material while it is changing state, is called "latent heat." The word latent means hidden, and it certainly looks as if the heat is hidden since it is absorbed by the body without raising its temperature. Evidently then 1 lb. of water at the freezing point will contain more heat than 1 lb. of ice. When all the ice is melted the continued supply of heat will now cause the temperature of the water to rise until it reaches 212 deg. F. The temperature will remain constant at 212 deg. F. until all the

FIG. 44.



water has changed to steam, when again heat will be absorbed, viz., the latent heat.

The heat absorbed at the melting point is called "Latent Heat of Fusion," and for ice it is 144 heat units, i.e., in changing 1 lb. of ice at 32 deg. F. into water at 32 deg. F. 144 B.Th.U. will be absorbed. The heat absorbed at the boiling point is called the "Latent Heat of Vaporisation," and for water is 970 heat units, i.e., in changing 1 lb. of water at 212 deg. F. into steam at 212 deg. F. 970 B.Th.U. will be absorbed. Naturally the steam in condensing to water at its boiling point will give up this latent heat, and this should make quite clear to us why a scald from steam is more severe than a scald from hot water.

Melting Point.

The constant temperature at which a sond changes to a liquid, or a liquid changes to a solid is called the melting point of the substance. Similarly, the constant temperature at which a liquid changes to a gas, or a gas changes to a liquid, is called the boiling point of the substance. In the article dealing with thermometers we spoke of these points as fixed points as far as water was concerned. We may now add that for all simple substances such as lead, tin, wax, linseed oil, and alcohol, they are fixed points, and, one method that helps to decide the name of a substance, is to find its melting point or boiling point and then to refer to a book of tables where will be found a list of substances with their melting points and boiling points given.

Experiment.

Many methods have been adopted for determining the melting point of a substance, and of these we will describe that for finding the melting point of naphthalene (Fig. 43B). It is known as the "curve of cooling method." It can be used for any substance which melts below the temperature of boiling water. The apparatus is

FIG. 45.

quite simple. It consists of a beaker, or jug, of water placed over a gas burner. Dipping in the water in the jug is a tube containing some naphthalene, in which is fitted a thermometer. The water is boiled and, in a short time, the naphthalene will melt and finally take the temperature of the water. The gas is then turned out, and, as the water and naphthalene cool, the reading on the thermometer is taken every minute. A curve is then plotted showing the relation between time and temperature. Figure 44 gives the curve of an actual experiment. It will be noticed that, after five minutes, the temperature has fallen to 79.9 deg. C., and for the next seven and a half minutes it remains steady at this temperature. After that the temperature gradually falls. The temperature 79.9 deg. C. is the melting point of naphthalene.

Plastic or Viscous State.

Some substances, like glass, wrought iron, pitch, and clay, do not seem to have a definite melting point. They pass through a condition where they are neither liquid nor solid, but in which they are soft and workable. This is called the plastic or viscous state. There is a range of temperature of several degrees during which this condition exists. It is during this condition that glass can be bent or blown into the various shapes required, that wrought iron can be bent, hammered, or welded, and in which the plumber is able to work his solder before it hardens.

In the case of solder it is interesting to note that both the substances of which it is composed, viz., lead and tin, have definite melting points, but, when mixed together to form solder, these definite melting points disappear and a plastic condition is set up at a lower temperature. The melting point of lead is 327 deg. C., and that of tin 232 deg. C. The curve of cooling of solder was taken, starting at a temperature of

FIG. 46.

250 deg. C. It was found that when the temperature 221 deg. C. was reached the solder became pasty, and this continued to about 175 deg. C. After that it seemed to harden, and at 172 deg. C. the temperature remained steady for a few minutes while the solder solidified.

Seger's Cones.

As mentioned above, clay is one of those substances which, when heated, has a plastic or pasty state. Different mixtures of clay will fuse or soften at different temperatures. These may vary from 900 deg. C. to 1,300 deg. C. Clay mixtures, having different fusing temperatures, are made up into the shape of cones, called Seger's cones. By means of these the temperature inside brick and tile kilns can be observed, for, as shown in the illustration, Fig. 46, when a particular temperature is reached, the cone corresponding with that temperature will bend over and slump.

Change of Volume.

Many of us, as householders, are only too familiar with the change of volume that accompanies change of state when we have to send for the plumber to repair our water pipes after a severe frost.

All substances, when they change state, change their volume. Some in the change from liquid to solid get larger, *e.g.*, water type metal, and cast iron. Some, on the other hand, get smaller, *e.g.*, wax and lead.

Because of this, a good lead casting cannot be obtained unless pressure be applied to the liquid metal as it cools and solidifies.

Water, as we all know, in its change to ice, exerts a tremendous force, and Fig. 45 illustrates an experiment which can easily be performed to demonstrate this very great force. Fig. 45 A shows an iron bottle with walls ¼ in. thick and a screw stopper. After being filled with water it is packed in a freezing mixture (crushed ice and salt) and covered with a heavy board as shown at Fig 45 B. After a very short time the bottle bursts with a fairly loud report.

Many suggestions have been put forward to prevent pipes from bursting during frosty weather, *e.g.*, emptying the pipes (considerable trouble), leave the water running (objected to by the water companies), but there is no doubt that the most effective method is to "lag" the pipes, *i.e.*, to cover them with a sufficient thickness of non-conducting material. In the case of lead pipes there is a dodge, sometimes adopted, of taking a hammer and flattening the pipes a bit, so that their cross-section shall be oval-shaped instead of circular. The explanation is that for the same perimeter the area of a circle is larger than that of an oval or an ellipse, and the water in changing to ice forces the pipe back into a circular cross-section.

There seems no doubt that the disintegration of bricks and stones is partially explained by the freezing of the water that has been absorbed by them. One of the methods adopted for testing the weathering of stones is, after soaking them with water, the repeated freezing and thawing of them.

Boiling Point.

Before leaving the subject of change of state we will just say a word or two about the change from a liquid to a gas. To find the boiling point of a liquid we use apparatus illustrated in Fig. 43 A. Into a Florence flask, which has a long neck and a side tube, is put a small quantity of the liquid whose boiling point is wanted. The thermometer is arranged so that its bulb is above the liquid. Upon heating the liquid a temperature is reached which remains constant. This is the boiling point of the liquid.

The volume change, when a liquid passes to a gas, is very much greater (a yard of water becomes a mile of steam) than in the change at the melting point, and coincident with this is the great pressure exerted, sufficient to burst boilers. The boiling point of a liquid depends upon the pressure upon its surface, and many experiments can be performed to show that a liquid will boil at a much lower temperature under a reduced pressure, also at a much higher temperature under increased pressure.

WHAT IS A PERPETUAL CONTRACT?

A curious point was raised in the case Crediton Gas Company *v.* Crediton Urban District Council, reported in the Court below, 1928, 1 Ch. 174, and in the Court of Appeal, *Weekly Notes*, March 17. In 1843 a company, the Crediton Gas and Coke Company, was formed to supply the parish and neighbourhood of Crediton with gas. In 1905 this company had been acquired by the Crediton Gas Company, Ltd., but in the following year this limited company was dissolved, and under the Crediton Gas Act, 1906, the plaintiff company was formed of its members as a body corporate, with perpetual succession and with a corporate seal. By an agreement under seal dated March 30, 1909, between this statutory company and the District Council, the company agreed to light all public lamps "from and after the first day in September in every year up to the following first day of May inclusive" at certain rates. The rates were varied by a supplemental agreement dated June 30, 1921. In the operative clauses of neither of these agreements was there any express provision for the termination of the agreements by either party. On April 30, 1927, the defendant Council had served a notice on the Gas Company determining the agreement for the public lighting of the district on the following August 31.

The Gas Company was seeking a declaration that the notice was of no effect and inoperative, and contended that the agreement could not be determined without their consent; in other words, they contended that the agreement was perpetual. The plaintiffs, in support of this contention, relied upon certain passages of judgments in the Court of Appeal and the House of Lords in Llanelly Railway and Dock Co. *v.* London and North-Western Railway Co. (L.R. 8, Ch. 942; and L.R. 7, H.L. 550). The effect of those passages was that where an agreement *de futuro* is indefinite and unlimited in respect of time, the onus of proving that it is not indefinite is laid upon the person supporting that allegation, and this can only be done by proving that the nature of the contract is incompatible with permanency, or from some rule of law applicable thereto.

The passage relied upon by the plaintiffs from the judgment of Lord Justice James in the Court of Appeal in the above case was expressed in wider terms than that delivered by Lord Selborne in the House of Lords, as he spoke of "every contract" being *prima facie* permanent, whereas in the House of Lords the character of perpetuity attaching to the contracting parties was treated as an element.

That element was, however, present in the case we are considering, one of the parties being a statutory company and the other a public authority; but it was held by the Court of first instance that the nature of the contract itself involved an implication that either party could terminate it. When the agreement was made, the public lighting was established, and there were no service expenses in carrying out the contract, which was merely a commercial contract securing customers for the gas.

The decision of the Court of Appeal is at present very shortly reported, but it appears that Court not only agreed that the nature of the contract was incompatible with perpetuity, but that a contrary intention could be deduced from it. This latter point was based upon two points:—The agreement made in 1909 between the parties contained recitals to the effect that an earlier agreement between the plaintiffs' predecessors and the defendants was to remain in force until the defendants should terminate it; and in the supplemental agreement of 1921 there was a provision vesting certain lamps in the defendants if the agreement should last 15 years.

It has to be remembered that perpetuities in various contracts are hedged about with statutory restrictions, and we think we may say that in all cases, unless the intention to the contrary is very clearly expressed in the document, the Courts lean to a construction that will not involve perpetuity.

In the Llanelly case the agreement was made under the Railway Clauses Act, 1845, and, as the House of Lords pointed out, any differences occasioning hardship could be adjusted under the Railway Companies Arbitration Act, 1859, and in that case Lord Justice James pointed out that there were many contracts in which, from their nature, permanence or perpetuity could not be implied, and he instanced contracts of partnership, contracts of master and servant, principal and agent, and so on.

All these subtleties of the law can, however, be avoided by persons when they enter into agreements or contracts taking the simple precaution of seeing how the agreement or contract is to be determined, and expressing in clear terms how it is to be ended and the length of the notice required.

WATER SUPPLY TO SEPARATE HOUSES

In a recent case, Sunderland and South Shields Water Company *v.* Hilton and Others, reported in *The Times*, March 24, the Court was called upon to interpret an expression in a private Act of the plaintiffs which may possibly occur in other private Acts. Section 36 of the Sunderland and South Shields Water Act, 1921, provided that "The Company shall not be bound to supply more than one house by means of the same communication pipe, and they may, if they think fit, require that a separate pipe be laid from the main into each house supplied by them with water." The Sunderland and South Shields Water Acts incorporated the Waterworks Clauses Acts so far as they were not inconsistent with the same.

The "houses" in question consisted of one building of two floors, each floor being entirely unconnected with the other floor, and being provided with a separate means of access. At the back of the building was a yard, to which the occupiers of each floor had separate access, but in the yard were conveniences and a wash-house which the inhabitants of each floor used in common. The water main was laid in a road at the back of the yard, and from the main a single pipe was laid in the yard, with a branch pipe supplying the conveniences and a tap in the yard, and the single pipe continued into the houses, supplying a scullery on the ground floor and a scullery on the first floor.

In November, 1926, owing to the occupiers of both floors being in arrear with their water rates, the supply was cut off, under section 74 of the Waterworks Clauses Act, 1847. In January the occupier of the ground floor left the premises without paying the arrears of rates, but the occupier of the first floor had paid all the arrears and half the cost of disconnecting the supply. The ground floor had been let to a new tenant, and on January 24, 1927, both sets of occupiers had applied to the Company for a supply of water. Subsequently the Company had informed the owners that the supply would not be renewed unless the owners, at their own expense, installed a separate pipe to each floor.

In these proceedings the Company were seeking a declaration from the Court that each floor constituted a separate "house," and therefore, that under the above section of their Act they were entitled to require the provision of a separate pipe to each floor. The Court decided that the plaintiffs' contention was untenable, because it ignored the common user enjoyed by the occupiers of both floors, of the yard with the conveniences and the wash-house, a common user essential for the reasonable user and enjoyment of the two floors, and pointed out it would be impossible for the Company to cut off the supply to one occupier without affecting the other, and this would be the same even if each floor was supplied with a separate pipe. The declaration sought was, therefore, refused, the whole premises being held to be one "house" for the purposes of this section.

A number of cases were cited to the Court, but these related to the interpretation to be placed upon the word "house" in other connections, such as for the purposes of Inhabited House Duty or in agreements relating to building estates, and the Court intimated that they did not afford much assistance on the point raised under this Act, neither did it serve a useful purpose to refer to section 36 of the Public Health Act, 1875, which related to sanitary matters.

Questions similar to the above have been raised under numerous Statutes: for instance, the Rent Acts, and in connection with rating; but as this decision shows, the subject matter of the legislation has to be considered, and an interpretation placed upon words and expressions in relation to that subject matter.

INTENSIVE TRAINING IN THE BUILDING INDUSTRY

A problem of considerable magnitude with which the military authorities have to deal is that of the welfare of the time-expired soldier. Every year a large number of young men complete their military training and return to civil life. What opportunities will they have of earning a livelihood for themselves and for any persons who may be dependent upon them? Does the country make sufficient provision for men who have given valuable years of their lives in order that Britain and the Empire may have an adequate defence force? The War Office has not been short-sighted, having established three vocational training centres, situated at Aldershot, Chiseldon, and Hounslow respectively.

During the last six months of a soldier's service with the Colours he is enabled, by means of the vocational training centres, to acquire a knowledge of one or other of a number of useful trades. At Hounslow, engineering and a number of other trades of a like nature are taught. At Chiseldon the training given is chiefly connected with gardening and agriculture. At Aldershot the building and constructional trades are taught.

Only soldiers who have a satisfactory character are allowed to apply to their commanding officers for permission to join a vocational training centre. When a soldier's application for vocational training has been considered and approved by the War Office, he receives a notification, through the proper channels, that he has been appointed to a centre which gives the training he has chosen. On arrival at the centre he is interviewed and is given some useful advice concerning the training. These interviews are very helpful to many new students who, as a result, have changed over from the trade they had originally chosen to one to which events proved they were far better suited.

Some fine work has been satisfactorily carried out by the students at the training centre for the building trades at Aldershot; work comprising sound construction and good finish is to be seen in actual existence, and this in connection with one of the most difficult of trades to learn, viz., plumbing.

A student joining the centre at Aldershot has a choice of one or other of the following trades:—bricklaying, carpentry and joinery, draughtsmanship, plumbing, plastering, and painting. Initial training is first given, this being followed by constructive training, that is, the student is given actual constructional work. For example, the centre undertakes work for the military authorities, or for anyone directly connected with the Army. This work includes the erection of new buildings and the repair and re-decoration of old ones.

As the authorities desire to avoid friction with building firms, no work whatever is undertaken for civilian residents. A staff of highly-skilled instructors giev practical demonstrations, detailed instructions, and technical lectures. Special lecturers attend occasionally, and demonstrations with new or improved appliances are given. Cinematograph films are also made use of, the pictures showing experts engaged in carrying out actual work that is of practical value and of educational interest to the students.

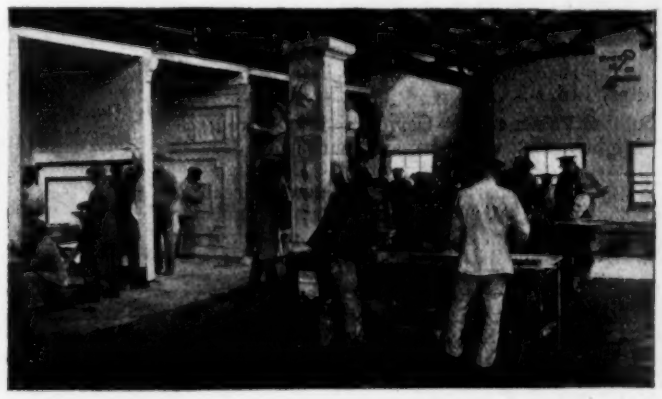
The centre has a fine lecture-hall, a library of technical books, and a number of working models; during the winter months it has its own evening classes, and these are well attended. Strict timekeeping is a hard and fast rule, and the importance of avoiding waste of all kinds is impressed upon the student. The centre has its own employment agency, through the medium of which many students have been placed in well-paid employment.

Can a man learn sufficient in the short period of six months to enable him to become a useful and profitable worker in one or other of the trades which comprise the building industry? To that question the War Office authorities have, we believe, given a very decided answer. During the war they proved that a healthy citizen could, by intensive methods of training, be made into a first-class fighting unit. In the present more agreeable times of peace the same authorities are proving that, by methods that are no less intensive, soldiers may, in a short period of time, be trained to use constructive tools instead of destructive weapons.

Near the Cambridge military hospital at Aldershot are two houses, recently completed, and now occupied. These houses bear the stamp of good workmanship throughout. The hollow brick walls, the carpentry and joinery, the slating, the plastering, the plumbing, the electrical installation, and the painting, will all bear the closest inspection. The work has been well and solidly done, and the finish is good, yet the men who have carried it out were doing military drill either upon the parade ground or in the manœuvre area less than six months previously. The two houses mentioned certainly furnish evidence of the possibilities of intensive training.

Permission to visit the training centre will readily be given to employers of labour and others that are directly interested; the students may then be seen engaged on initial training and on constructive work of a permanent character. Opportunities to inspect completed work will also be gladly given.

Bricklayers at Work in Initial Instruction Shed.



Plasterers' Workshop.

Houses in Military Camp (Built by Men with less than Six Months' Training.)

Carpentry and Joinery Workshop.

Army Vocational Training Centre, Aldershot.

NEW BUILDINGS IN LONDON

The Editor would be glad to receive information for publication under this heading from architects, builders, or other persons concerned.

Aberdeen-place.—Conversion.—It is proposed to convert the large mansion at 32, Aberdeen-place, W., into flats. Plans have been prepared by Messrs. Browne & Fulton, 201, Edgware-road, W.2.

Aldwych.—Building.—A large sub-station is to be constructed by the Charing Cross Electricity Supply Co., Ltd., 60, St. Martin's lane, W.C.2, at a cost of approximately £45,000.

Aldwych.—Offices.—The London County Council has approved the recommendation that the site in Aldwych, at its junction with Melbourne-place, be let on lease to Messrs. Perry & Bell, for the erection of office buildings. The plans for the proposed new buildings have been prepared by Messrs. Trehearne & Norman, of Windsor House, Kingsway, W.C.2.

Bloomsbury.—Buildings.—The Senate of University College are considering plans for the erection of a new Department of Chemistry, to be housed in a group of buildings on the University estate. The architects are Messrs. Richardson & Gill, FF.R.I.B.A., 41, Russell-square, W.C.

Denman-street.—Garage.—On a site at the back of the new Piccadilly Theatre, Denman-street, W.1, a large garage is now being erected to the plans of Mr. E. A. Stone, F.S.I., of 20, Berkeley-street, W.

Eltham.—Church.—The Bishop of Woolwich is about to purchase a site in Westhorne-avenue from the Woolwich Borough Council for the erection of a church.

Eltham. — Pavilion. — Messrs. Edwards Construction Co., Aldine House, Bedford-street, W.C.2, are to erect a sports pavilion in Footscray-road, Eltham, S.E., for Bishopsgate Estates, Ltd.

Fulham Palace-road.—Offices.—Mr. Alfred E. Nightingale, architect and surveyor, 35, Henderson-road, Wandsworth Common, S.W.18, has prepared plans for new offices and showrooms at 108, Fulham Palace-road, S.W., for Messrs. Bridger Bros., caterers. Mr. G. Jackson, of Chiswick, is the builder.

Guilford-street.—Flats.—Permission has been granted by the L.C.C. to the Foundling Estates, Ltd., to build ten-story flats on the Foundling Hospital site, Guilford-street, W.C.1

Hampstead.—Flats.—A large block of flats is about to be erected on the site of Bell Moor, which has been bought by Mr. Ernest Yates, Brook-street, W.1.

Hendon.—School.—A contract has been placed for the erection of the new Goldbeaters' School, on the Watling estate, which will provide accommodation for 120 scholars. The builders are Messrs. Welwyn Builders, Ltd., Welwyn, Herts. Plans have been prepared by Mr. Herbert A. Welch, F.R.I.B.A., 7, New-square, Lincoln's Inn, W.C.

Hendon.—Garage.—Garage and flats are being erected in Queen's-road, Hendon, by Messrs. Burdett (Harrow), Ltd. The steelwork is being supplied and erected by Messrs. Young & Co., 6, Queen Anne's-gate, Westminster, S.W.1. The plans have been prepared by Messrs. Hall, Jones & Dewhirst, architects, Parliament Mansions, Westminster, S.W.1.

Islington.—Tenements.—The tender of Messrs. G. Walker & Slater, Ltd., Pall Mall, S.W.1, has been accepted by the L.C.C., subject to the approval of the Ministry, for the erection of 24 tenements on the Ring Cross estate, Islington. Plans have been prepared by Mr. G. Topham Forrest, F.R.I.B.A.

Islington. — Conversion. — In connection with the conversion of the old Town Hall, Islington, into a cinematograph theatre, the contract has been placed with Messrs. Fairweather & Ranger, 18, Brownlow-street, Holborn, W.C.1. Messrs. Gray & Webb, of 18, Baker-street, W.1, are the architects.

Lambeth.—Building.—Mr. E. A. Stone has submitted plans to the local Council for the erection of a building on a site on the southern side of Stockwell Park-walk.

Lever-street —Warehouse.—A new warehouse is to be erected to the plans of Messrs. Gray & Webb, 18, Baker-street, W.1, in Lever-street, E.C The builders are Messrs. Hammond & Barr, 52, Beauchamp-place, Brompton-road, S.W.

Lewisham.—Library.—In connection with the enlargement of the public library at Lewisham, which was mentioned in our last issue, Mr. L. Jacob, 58, Gordon-square, W.C.1, has prepared the quantities.

Muswell Hill.—Hall.—The building committee of St. Matthew's has decided to build a permanent hall.

Penge.—Houses.—The Charity Commission, Ryder-street, St. James's, S.W.1, are to grant a building lease of a site in Mosslea-road for the erection of 12 houses.

Regent-street — Flats. — We understand that plans have been made for the construction in Regent-street, W., of a block of service flats. Messrs. Ernest Yates, of Brook-street, W., are connected with the scheme.

St. John's Wood.—Conversion.—Messrs. Browne & Fulton, 201, Edgware-road, W.2, have prepared plans for the conversion of 11, Northwick-terrace, N.W.8, into flats. The builder is Mr. M. Barnett, 4, Sheldon-street, Paddington, W.2.

Strand.—Adaptation.—No. 326 has been recently disposed of and is to be adapted as a quick-service restaurant, with offices, etc., on the four upper floors. Plans for the alterations have been prepared by Mr. H. W. Matthews, F.R.I.B.A., 550, Oxford-street, W.1.

Tavistock-square.—Premises.—The Westminster Bank, Ltd. propose to open a branch office in new premises to be erected in Tavistock-square and Woburn-place, W.C. The architect is Mr. C. Wontner-Smith, F.R.I.B.A., 2, Gray's Inn-square, W.C.

Twickenham.—Premises.—The National Provincial Bank, Ltd., are to build new branch premises in London-road, to plans prepared by their surveyor, Mr. F. C. R. Palmer, F.R.I.B.A., in conjunction with Mr. W. F. C. Holden, F.R.I.B.A., assistant surveyor, 15, Bishopsgate, E.C.

Twickenham. — Enlargement. — Premises in York-street and London-road have been acquired by the directors of the Midland Bank, Ltd., for the purpose of enlarging their adjoining local branch.

White Hart-lane.—Houses.—The Weir Hall Estate is to be developed, and four new roads and 190 houses constructed. The builder is Mr. F. J. C. Ingram, Prince's-avenue, Palmer's Green. The architect is Mr. O. H. Cockrill, A.R.I.B.A., Southend-on-Sea.

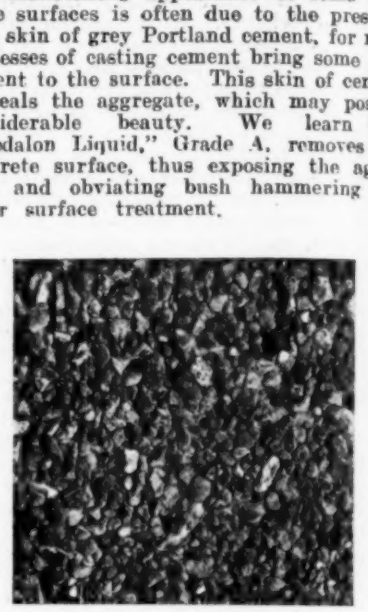
Willesden.—School.—The new elementary school at Willesden Green, the foundation-stone of which has just been laid, will have seven classrooms and accommodation for about 300 children. The design of Mr. Wallace J. Gregory, of London, the new erection will be a two-story building, constructed on the open-corridor principle. The entire cost is estimated at about £12,000.

Wood Green.—Hall.—Mr. O. Archer, architect, has submitted plans to the Wood Green Council for the erection of a hall at the corner of the Crossway and Perth-road. The hall is for the Salvation Army.

TRADE NEWS

Exposing Concrete Aggregate Surface.

We are able to give some details of a preparation manufactured and marketed by Messrs. Redalon, Ltd., of Regent House, Regent-street, W.1, which, it is claimed, solves two universally-experienced difficulties of concrete construction. The patchy and monotonous appearance of some concrete surfaces is often due to the presence of a skin of grey Portland cement, for most processes of casting cement bring some neat cement to the surface. This skin of cement conceals the aggregate, which may possess considerable beauty. We learn that "Redalon Liquid," Grade A, removes the concrete surface, thus exposing the aggregate and obviating bush hammering and other surface treatment.



Concrete after Treating with "Redalon Liquid."

"Redalon Liquid," Grade B, is for use in obviating hacking the concrete to provide a surface to which a cement-concrete or other plaster rendering can be easily and properly bonded. We understand that "Redalon" in no way injures the concrete. "Redalon Liquid," Grade B, has been used on the retaining wall of the new head offices for the Underground Electric Railway, St. James's Park, by Messrs. the Trussed Concrete Steel Company. Messrs. Gotch and Saunders, FF.R.I.B.A., in conjunction with Sir Edwin Lutyens, R.A., have specified the use of "Redalon Liquid" on the remaining portions of the Midland Bank, Poultry. With Mr. Frederic Coleman's permission, sample concrete slabs treated with "Redalon Liquid" will be on view on the Adamite Company's stand G. 136, at Olympia.

Old Bridge House at Ambleside.

At the annual meeting of the English Lake District Association held at Grasmere, Mr. W. G. Burrill (Windermere) presiding, it was stated that the end of the jubilee year found the association with assets to the value of £529, and to mark the jubilee, extra work had been done in repairs to mountain bridges and indicators and the erection of new ones. All the officials were re-elected.

The chief business was the voting of £25 towards the fund for purchasing the old bridge house at Ambleside. Mr. Gordon Wordsworth said they had been rather disappointed at the way subscriptions had come in. They had got £295 towards the £450 wanted. The promoters of the scheme had paid £225 for the bridge house which would be repaid out of the subscriptions. The beck wall required repairing, the ground was very rough and needed attention, there were some old buildings to come down, and the bridge house itself was in need of repair, and they also proposed to place seats and lay out the surroundings. Satisfaction was expressed at the work done on Tiberthwaite (Coniston) and Lodore (Barrowdale) bridges, and Mr. Pape drew attention to the need of attention to the bridge at the top of Sty Head Pass. The amount received in subscriptions last year amounted to over £125.

RATES OF WAGES IN THE BUILDING TRADE

[Every endeavour is made to ensure accuracy but we cannot be responsible for errors.]

	Masons.	Brick-layers.	Car-penters Joiners.	Plas-terers.	Slaters.	Plum-bers.	Pain-ters.	Lab-ourers.
Aberdare	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Accrington	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Alfreton	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Alnwick	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Altrincham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Ashford Kent	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Ashington	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Ashton-under-Lyne	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Aylesbury	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Aylsham	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Banbury	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Barnsley	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Barnstaple	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Barrow-in-Furness	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Barry	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Basingstoke	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Bath	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Bedford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Berwick	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Bexhill	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Birkenhead	1/10	1/10	1/10	1/11	1/10	1/10	1/9½	1/4½
Birmingham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Bishop Auckland	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Blackburn	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Blackpool	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Bolton	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Bournemouth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Bradford	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Bradford-on-Avon	1/4	1/4	1/4	1/4	1/4	1/4	1/3	1/0
Braintree	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Brentwood	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Bridgwater	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Bridlington	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Brighton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Bristol	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Bromsgrove	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Bromyard	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Bungay	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Burnley	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Burton-on-Trent	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Bury	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Buxton	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Cambridge	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Canterbury	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Cardiff	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Carlisle	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Chatham	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Chelmsford	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Cheltenham	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Chester	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Chesterfield	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Chorley	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Cirencester	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/0½
Clacton	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Colchester	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Coventry	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Cranbrook	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Crewe	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Cromer	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Darlington	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Deal	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Denbigh	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Derby	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Devizes	1/4	1/4	1/4	1/4	1/4	1/4	1/3	1/0
Dewsbury	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Doncaster	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Dorchester	1/4	1/4	1/4	1/4	1/4	1/4	1/3	1/0
Dorking	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Dovercourt	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Driffield	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Droitwich	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Dudley	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Durham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Eastbourne	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
E. Glam. (Mon. Val.)	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Ely	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Exeter	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/2
Exmouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Fakenham	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Felixstowe	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Folkestone	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Frome	1/4	1/4	1/4	1/4	1/4.	1/4	1/3	1/0
Glossop	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Gloucester	1/6	1/6	1/6	1/6	1/6	1/6	1/5	1/1½
Godalming	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Goole	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Gosport	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Grantham	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Great Yarmouth	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Grimsby	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Guildford	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Halifax	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Harpenden	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Harrogate	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Hartlepools	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Harwich	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Hastings	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Hatfield	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Hednesford	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Hereford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/4½	1/1½
Herne Bay	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Hertford	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Hitchin	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Hoddesdon	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Holt	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Huddersfield	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Hull	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Hunstanton	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Huntingdon	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Isle of Wight	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Ipswich	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Keighley	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Kettering	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Kidderminster	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
King's Lynn	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Lancaster	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Leamington Spa	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2

	Masons.	Brick-layers.	Car-penters Joiners.	Plas-terers.	Slaters.	Plum-bers.	Pain-ters.	Lab-ourers.
Leeds	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Leicester	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Leighton-Buzzard	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Lichfield	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Lincoln	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Littlehampton	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Liverpool	1/10	1/10	1/10	1/11	1/10	1/10	1/9½	1/4½
Llandudno	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Llanelly	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
London:								
12 m. radius	1/9	1/9	1/9	1/9	1/9	1/9	1/8	1/4
12-15 m. radius	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/3½
Loughborough	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Lowestoft	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Luton	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Macclesfield	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Maidstone	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Malvern	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Manchester	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Mansfield	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Margate	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Market Harb'rough	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Matlock	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Melton Constable	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Melton Mowbray	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Merthyr Tydfil	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Middlesbrough	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Newark	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Newbury	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Newcastle-on-Tyne	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Newcastle-ur-Lyme	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
New Forest	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Newmarket	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Newport, Mon.	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Northampton	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Norwich	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2½
Nottingham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Nuneaton	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Oakham	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Oldham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Oxford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Paignton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Peterborough	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Plymouth	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/2½
Pontypridd	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Portsmouth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Preston	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Ramsgate	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Reading	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Redcar	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Redditch	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Reigate	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Retford	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Ripon	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Rochdale	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Rochester	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Rugby	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Saffron Walden	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
St. Albans	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
St. Helens	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Sawbridgeworth	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Saxmundham	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
Scarborough	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Sevenoaks	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Sheffield	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Shrewsbury	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Sittingbourne	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Southampton	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Southend-on-Sea	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Southport	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
South Shields	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Stevenage	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Stockport	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Stockton-on-Tees	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Stoke-on-Trent	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Stourbridge	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Stourport	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Stowmarket	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Stratford-on-Avon	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Stroud	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Sunderland	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Swaffham	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Swansea	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Swindon	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/4½	1/1½
Tamworth	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Taunton	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Thetford	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Torquay	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Totnes	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4	1/0½
Trowbridge	1/4	1/4	1/4	1/4	1/4	1/4	1/3	1/0
Tunbridge Wells	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Uttoxeter	1/5	1/5	1/5	1/5	1/5	1/5	1/5	1/0½
Wakefield	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Walsall	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Wallsend	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Warminster	1/4	1/4	1/4	1/4	1/4	1/4	1/3	1/0
Warrington	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Warwick	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Wells (Norfolk)	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Welwyn Gar. City	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
West Bromwich	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Weston-sup.-Mare	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Weymouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/0½
Whitby	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/2
Wigan	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Winchester	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Windsor	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/1½
Wisbech	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Wolverhampton	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½
Woodbridge	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/0
Worcester	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Worksop	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/1½
Worthing	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/0½
Wrexham	1/7	1/7	1/7	1/7	1/7	1/7	1/7	1/2½
Wroxham	1/3	1/3	1/3	1/3	1/3	1/3	1/3	11½
Wymondham	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	11½
York	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/2½

For rates of wages in the Building Trade in Scotland, see page 601.

CONTRACTS, COMPETITIONS, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk are advertised in this number. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed, that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given is the latest date when the tender, or the names of those willing to submit tenders, may be sent in, the name and address at the end is the person from whom or place where quantities, forms of tender, etc., may be obtained.

Following is a list of abbreviations :—Borough Surveyor, B.S.; Borough Engineer, B.E.; District Surveyor, D.S.; Clerk, C.; Town Clerk, T.C.; County Engineer, C.E.; County Surveyor, C.S.; County Architect, C.A.; Surveyor, S.; Engineer, E.; Borough Architect, B.A.; Architect, A.

BUILDING, PAINTING, ELECTRIC LIGHTING, HEATING, ETC.

APRIL 9.

Carmarthen.—Improvements.—Removal of existing fencing and flooring of existing cattle standings and laying down of new flooring, erection of new fencing, dial weighbridge and sale rings at Cattle Market, for C.B. G. L. Ovens, B.E. and S. Dep. £1.

Horsforth.—Houses.—Caretaker's house and conveniences at Public Library, Mechanics' Institute, for U.D.C. Jas. R. Aldersley, architect. Dep. £1 1s.

Landrake.—House.—At Landrake, St. Germans, for H. S. B. Kelly. H. R. Venning, architect and surveyor, Midland Bank-chambers, Liskeard.

Oldham.—Demolition.—Of property, 456, Manchester-rd., Holinwood, and 15, George-st., for C.B.B.E. and S.

APRIL 10.

Barnes.—Wall.—Construction of a proposed concrete retaining and boundary wall, on north side of their depot, for U.D.C. F. P. Kindell, E. and S. Dep. £2 2s.

Bournemouth.—Public Baths.—Erection of, on the Northwood estate, for the County Borough. T.C. Dep. £2 2s.

Glasgow.—Jobbing Work.—For Housing Department. D. Stenhouse, T.C.

Govan.—Solarium.—At Hawkhead Asylum, Crookston, for District Board of Control. J. Taylor, architect, 166, Buchanan-st., Glasgow.

Ipswich.—Demolition.—Of buildings situated at junction of Crown-st. and Hyde Park-corner, consisting of Old Crown Hall and two shops adjoining, together with living accommodation above, for C.B. E. McLaughlan, B.E.

Ramsgate.—(a) Building and lighting; (b) Lift, at the St. Lawrence Cliffs estate, Ramsgate, for the Corporation. A. Balsdale Clarke, T.C., Albion House, Ramsgate. (a) Dep. £3 3s. (b) Dep. £2 2s.

Reading.—Installation.—Provision and installation of a "Sentry Boiler" and necessary plumbing in connection with the domestic hot water supply, for P.C. W. H. Oliver, Clerk, 32, Thorn-st.

Sandbach.—Extensions.—Of Sunday school at Brookhouse Green, for Trustees. A. Price & Sons, architects.

Sandbach.—Houses.—Non-parlour type cottages on a site off Crewe-rd., for U.D.C. J. R. Price, architect.

Sittingbourne.—Houses.—30, Trotts Hall Orchard, Bell-rd., for U.D.C. W. M. Lashmar, S. Dep. £1.

St. Helens (I. of W.).—Houses.—12, semi-detached, at Great Preston-rd., High Park, and 6 at St. Michael's-rd., St. Helen's Village, for U.D.C. L. F. Phillips, clerk, Alexandra-rd., High Park, Ryde, I. of W.

Whalley.—Hostel.—Nurses' hostel, at Calderstones Institution, for Lancashire Asylums Board. G. Etherton, Clerk of the Asylums Board. Dep. £1 1s.

APRIL 11.

Barnes.—Telephone Exchange.—At Barnes, S.W., for the Commissioners H.M.O.W. Contracts Branch, King Charles-st., S.W.1. Dep. £1 1s.

Bournemouth.—Pavilion.—Extension of tennis pavilion, Seafield Pleasure-grounds, Southbourne, for C.B. F. P. Dolamore, B.E. Dep. £1 1s.

Chesterfield.—Houses.—34, St. Augustine's estate, and 6 in Walton-drive, Boythorpe estate, for T.C. P. Morris, T.C. Dep. £2 2s.

Elgin.—Baths.—On North-lane, for T.C. A. A. Turriff, B.S.

Hornsey.—Electricity Sub-station.—In steel and brickwork, at Priory-rd., for Hornsey B.C. W. H. Adams, B.E. and S., Town Hall, Highgate, N.6.

Isle of Thanet.—Offices.—At Poor Law Institution, Minster, near Ramsgate, by alteration and adaptation of an existing building, for B.G. Reeve & Reeve, architects, 1, Union-crescent, Margate.

Larne.—Conversion.—Of workhouse buildings into district hospital, for B.G. Jas. A. Hanna, architect and civil engineer, 29, Wellington-place, Belfast. Dep. £2 2s.

Leeds.—Painting.—At Gateforth Sanatorium, Hambleton, near Selby, for Corporation. W. T. Lancashire, City Engineer.

London.—Heating.—Accelerated low-pressure hot water heating at Fulham Telephone Exchange, S.W., for H.M.O.W. Contracts Branch, H.M. Office of Works, King Charles-st., S.W.1. Dep. £1 1s.

Manchester.—School. In Beaver-rd., Didsbury, for E.C. P. M. Heath, Town Clerk. Dep. £2 2s.

Manchester.—Alterations.—To child welfare centre, 26, Clayton-st., Clayton, for T.C. City Architect.

North Dublin.—Room.—Additional room to labourer's cottage, at Puckstown, for R.D.C. F. P. Russell, 7, D'Olier-st.

Rotherham.—School.—At Thorpe Hesley, to accommodate 510 children, for C.B. J. A. Mair, Secretary for Education. Dep. £1 1s.

West Riding.—Improvements.—For (a) painting work, (b) tar painting, repair and surfacing of asphalt paths and courts, at Storthes Hall Mental hospital, Kirkburton, near Huddersfield, for Mental Hospitals' Board. W. E. H. Burton, architect and engineer, West Riding Mental Hospitals Board Offices, Wakefield.

APRIL 12.

Appletreewick.—Alterations.—Also improvements to Council school, for West Riding E.C. Education Department, County Hall, Wakefield.

Beeston.—Houses.—42, non-parlour, in Clifford-av. and Wollaton-crescent, off Wollaton-rd., Beeston, for U.D.C. E. A. Bush, S. Dep. £2 2s.

Bexhill.—Cottages.—Erection of 50, in Brixton-drive, for the B.C. Geo. Ball, B.S. Dep. £1 1s.

Caernarvon.—Alterations.—Also improving structure of Caernarvon National Schools. Llewelyn Lloyd Jones, architect and surveyor, Lloyds Bank-chambers.

Chippenham.—Houses.—20 at Corsham, and 10 at Box, also sewage disposal works in connection therewith, for R.D.C. Parker Pearson & Ross Hooper, architects and engineers, Dallas-chambers. Dep. £5 5s.

Clydebank.—Houses.—32 flatted 3-rooomed houses at Whitecrook housing site, for T.C. B.S. Dep. £2 2s.

Coventry.—Conveniences.—Combined public conveniences and electric light sub-station, on a site situate on Foleshill-rd., for T.C. E. H. Ford, City E. and S. Dep. £2 2s.

Dover.—Repairs.—Structural repairs at Buckland housing site, for T.C. W. B. Smith, B.E. Dep. 10s.

Dundee.—Floors.—Reinforced concrete floors at extension to boiler-house at Carlina Port generating station, for Corporation. D. H. Bishop, general manager and engineer.

Edlington.—School.—New middle school for 500 scholars, and a new elementary school for 500 scholars, together with caretaker's house, for West Riding E.C. Education Department, County Hall, Wakefield.

Hampstead.—Building, Painting, Roof-work.—To mortuary, for the Guardians, Parish of St. John, H. Westbury Preston, C., Guardians' Offices, North End, Hampstead, N.W.3. Dep. £2 2s.

Hull.—Foundations.—For tanks on Alexandra Dock estate of L. and N.E. Rly. Todd & Thorp, Land of Green Ginger, Hull. Dep. £1 1s.

Ingleton.—School.—To accommodate 410 children, with special subjects room, for West Riding E.C. Education Department, County Hall, Wakefield.

Leith.—Pointing, etc.—Wall at St. Ninians U.F. Church, Commercial-st. B. Cromarty, 14, Hawthorn Bank-terrace.

Manchester.—Gates.—Wrought-iron entrance gates on site of new gasworks at Partington, for T.C. J. H. Silfitoe, secretary, Gas Department.

Nottingham.—Employment Exchange.—At Basford, for the Commissioners H.M.O.W. Contracts Branch, King Charles-st., S.W.1. Dep. £1 1s.

Oswestry.—Houses.—10 parlour type and 28 non-parlour type, on the Llwyn housing estate, for the B.C. T. Ridge, A.R.I.B.A., Bank-chambers, Oswestry. Dep. £1 1s.

Richmond.—Repairs.—Certain painting work and repairs to buildings on ground of Athletic Association, Ltd. E. J. Partridge, F.R.I.B.A., architect and surveyor, Bank-chambers.

APRIL 13.

Ballyward.—Repairs.—External repairs to Drumgooland Parish Church, for Select Vestry. Blackwood & Jury, architects, 41, Donegall-place, Belfast.

Brighton.—House.—Engine house, workshops, etc., at Waterworks pumping station, Patcham, near Brighton, for C.B. A. B. Cathcart, Waterworks Engineer, 12, Bond-st. Dep. £5.

Glamorgan.—Telephone Exchange.—At Mumbles, for the Commissioners H.M.O.W. Contracts Branch, King Charles-st., S.W.1. Dep. £1 1s.

APRIL 14.

Abergavenny.—Houses.—24, off Park-rd., for T.C. W. H. Hopwood, T.C.

Begelly.—Alterations.—Also additions, to house called "Buttles." S. Owen, Picton Castle Estate Offices, Narberth.

***Cheltenham.**—Houses.—Erection 68 non-parlour-type houses, for the Cheltenham B.C. T. Malvern, L.R.I.B.A., 21, Winchcomb-st., Cheltenham. Dep. £2 2s

Durham.—Painting.—Otuside painting of various County police stations and houses, for C.C. Wm. J. Merrett, C.E. and S.

London.—Alterations.—For (1) laying new maple floor and incidental works in connection therewith; (2) installation of an electric lift; (3) alterations to doorway of receiving ward; (4) partitioning of bedroom; (5) other works, including painting, pointing, cleansing, repairs generally, at St. Marylebone Hospital, Rackham-st., for St. Marylebone B.G. F. W. Shenton, F.R.I.B.A., 27, Fitzroy-st., W.1. Dep. £1 1s.

Luton.—Room.—At rear of 2, Upper George-st., for T.C. B.E., 18, Upper George-st.

Porkellis.—Renovation.—Of Wesleyan Church. E. J. Williams, secretary to trustees, Carnebone.

Sule Skerry.—Building.—To accommodate engines and wireless plant at Wireless Beacon, for Northern Lighthouses Commissioners. D. A. Stevenson, Engineer to the Commissioners, 84, George-st., Edinburgh. Dep. £2 2s.

APRIL 16.

Bootle.—Rebuilding.—Taking down and rebuilding boundary walls on north-east and south-east corners of junction of Marsh-lane and Litherland-rd., for C.B. B.E.

Leeds.—Fencing.—Provision of approximately 400 lin. yds. of unclimbable iron fencing, for T.C. H. Shortreed, Waterworks Manager.

Leeds.—Masonry.—Stone dwarf wall, approximately 400 yds. in length, at Headingley filter beds, Otley-rd., and erection thereon of similar length of iron railings, for Waterworks Committee. Waterworks Department, 26, Great George-st.

Liverpool.—Additions.—Also alterations, to Butler-st. Council school, for T.C. Land Steward and Surveyor. Dep. £2 2s.

Menston.—Painting.—External of several buildings at Mental Hospital, Menston, near Leeds, for West Riding Mental Hospital Committee. W. E. H. Burton, Architect and Engineer.

Whitley Upper.—Houses—10 stone-built and blue-slated two-storeyed non-parlour-type Council houses at Denby-lane, Grange Moor, for U.D.C. E. G. Hollingworth, S., South View-terr., Grange Moor.

APRIL 17.

Bootle.—Houses.—23, in Linacre-lane and Fernhill-rd., for C.B. B. E. and S. Dep. £2 2s.

Bridlington.—Heating.—Accelerated low-pressure hot water heating at Bridlington P.O., etc., for H.M.O.W. Contracts Branch, H.M. Office of Works, King Charles-st., S.W.1. Dep. £1 1s.

Cardiff.—School.—Elementary school in Grand-av., Ely, for E.C. G. H. Whitaker, architect to E.C. Dep. £2 2s.

Leeds.—Painting.—Inside at Holbeck Institution, for B.G. H. Ford, clerk, 11, South-parade.

Plymouth.—Houses.—267 (in brickwork) for the Plymouth C.B. J. Wibberley, B.E., Sun Buildings, Plymouth. Dep. £2 2s. to Boro. Treasurer.

St. Albans.—Wing.—New X-ray wing at the St. Albans and Mid-Herts hospital, Church-crescent, St. Albans, for Committee. W. G. Marshall, secretary, Church Crescent.

Whitley Lower.—Premises.—For Firfield Industrial Co-operative Society, Ltd. General Manager at the Society's Offices, Knowles-st., Mirfield.

APRIL 18.

Liverpool.—Dwellings.—30 tenement dwellings on Pitt-st. area, for T.C. Acting Director of Housing. Dep. £1 1s.

Portland.—Houses.—6, St. Paul's-rd.; 2, Hambro-rd.; 7, St. Martin's-rd.; 1, St. Martin's-rd., for U.D.C. R. Davison. E. and S. Dep. £1 1s.

APRIL 19.

Dover.—Elementary School with Conveniences and Contingent Works.—At Astor-av., for the Corporation. Wm. Boulton Smith, B.E., Maison Dieu House, Dover. Dep. £2 2s.

***Greenwich.**—Alterations and Repairs and Redecorations.—Conversion to two maisonettes at "The Woodlands," Vanbrugh-hill, Greenwich, S.E.10, for the Guardians of the Greenwich Union. Alfred Roberts, F.R.I.B.A., 92, London-st., S.E.10. Dep. £2

Hartley Wintney.—Houses.—20, semi-detached cottages at Marrowbrook-lane, Cove, for R.D.C. E. H. Milburn, clerk. Dep. £1.

Kingston-upon-Thames.—Endowed Schools properties situate in Portsmouth-rd., Surbiton, and comprising two dwelling-houses and land, total area 19,547 s. yds. A. W. Forsdike, T.C.

***Lanarkshire.**—Brickworks known as Carfin Brickworks, belonging to the Lanarkshire County authorities. W. E. Whyte, Dist. Clerk, Dist. Offices, Hamilton.

Newport.—New Station Buildings.—At Newport High-st. Station, for the G.W. Railway Co. The Engineer at Paddington Station. Dep. £2 2s.

APRIL 20.

Bedford.—(a) Houses, (b) Roads and Sewers.—76 houses for the Bedford B.C. N. Greenshields, A.M.I.C.E., B. E. and S., Newnham House, Houser-lane. Dep. £2 2s. for each contract.

London.—Stores and services, etc., for the periods of 6 and 12 months, commencing June 1, 1928, for the Metro. Water Board. Chief Engineer, 173, Rosebery-av., E.C.1 (Room 156).

APRIL 23.

Willesden.—Hospital Buildings.—New observation ward block and a new nurses' quarters block and incidental works at Dog-lane. F. Wilkinson, M.Inst.C.E., Town Hall, Dyne-rd., Kilburn, N.W.6. Dep. £2 2s.

MAY 7.

Lewisham.—Internal painting of the Lewisham Hospital, High-st., Lewisham, S.E.13, for the Lewisham Guardians. Guardians' Offices, 394, High-st. Dep. £3 3s.

NO DATE.

Belleek.—Stores.—At Garrison Creamery for Belleek Co-operative Society, Ltd. J. Donnelly, M.R.I.A.I., architect, Enniskillen.

Bradford.—Shop.—Shops, offices, Manningham-lane. T. L. Dixon, architect, surveyor, etc., Stanwix House, Buttershaw.

Bury.—In Moor-street, for John Eastham and Sons, Ltd., C. R. Cooper, L.R.I.B.A., architect, 21, Market-st.

Cardiff.—Alterations.—Also extensions, Williamstown branch, for Penygraig Industrial Co-operative Society, Ltd. W. T. Springall, Architects' Department, C.W.S., Ltd., St. Mary-st. Dep. £2 2s.

Coventry.—Cinema.—Super-cinema, together with billard-rooms and lock-up shops, in Holbrook-lane, for Brookville Picture House Co., Ltd. J. Bass, 3, High-st., Bedworth. Dep. £2 2s.

Perth.—Bungalows.—High-st. 6, Windsor-terr., Trebanog.
Ruthin—Heating.—Central heating of Town Hall, for T.C. J. Kershaw, B.S.
Upper Greetland.—Houses.—4 in Branch-rd., Upper Greetland. Rhodes & Rhodes, architects, West Vale.
Woodham Ferrers.—Excavation.—Also filling in of trenches at Woodham Ferrers, for approximate distance of 850 yds. Skelton, Farm Dept., Royal London House, E.C.2.

MATERIALS, ETC.

APRIL 10.
Broadstairs and St. Peters.—Kerbing and Channelling.—For U.D.C. H. Hurd, S.
Glasgow.—Sewage Materials.—For T.C. Manager, Sewage Dept., 50, John-st.
Glasgow.—Builder's Materials.—For Cleansing Department. Superintendent of Cleansing, 20, Trongate.
Ticehurst.—Road Materials.—For R.D.C. F. Laurens, S., Western-rd., Wadhurst.
Wycombe.—Limestone.—For R.D.C. A. L. Grant, S.

APRIL 11.
Broadstairs and St. Peter's.—Cast-iron Pipes and Specials.—For U.D.C. S.
Normanton.—Road Materials.—For U.D.C. S.
Carlisle.—Granite, etc.—For R.D.C. C.

APRIL 12.
Barnes.—Crushed Ballast.—For U.D.C. F. P. Kindell, E. and S.
Barnes.—Granite Chippings.—For U.D.C. F. P. Kindell, E. and S.
East Lothian.—Tar Supplies.—For C.C. Road Surveyor, Bank of Scotland-chambers, Haddington.
London.—Builders' Materials.—For G.W.R. Secretary, Paddington Station, W.2.

APRIL 14.
Prestwich.—Road Materials.—For U.D.C. M. A. Piercy, S.
Ripley.—Road Materials.—For U.D.C. G. W. Bird, S.

APRIL 16.
Birkenhead.—Cement, etc.—For C.B. F. E. Spencer, Borough Electricity Engineer.
Loughton.—Limestone, etc.—For U.D.C. H. White, S.
Witham.—Highway Materials.—For U.D.C. D. Jenkinson, S.

APRIL 17.
Bootle.—Kerb.—For C.B. B.E.

APRIL 18.
Wednesbury.—Highway Materials.—For T.C. A. Booth, B.E. and S.

APRIL 20.
Edinburgh.—Builders' Materials.—For P.C. W. M. Mowat, Inspector and Clerk.
London.—Cement, etc.—For M.W.B. Chief Engineer.

MAY 1.
Cairo.—Asphalt.—For Egyptian Ministry of Public Works. Department of Overseas Trade, 35, Old Queen-st., S.W.1. (B.X. 4263).

ENGINEERING, IRON AND STEEL.

APRIL 10.
Chorleywood.—Sewerage.—Laying sewers including construction of manholes, flushing tanks and sewage disposal works, for U.D.C. A. P. I. Cotterell, 54, Victoria-st., S.W.1. Dep. £5 5s.
Kilmarnock.—Widening.—Of Riccarton old bridge, for T.C. W. Dunbar, B.S.
Penmaenmawr.—Reconstruction.—Partial demolition of 2 boat jetties on beach at Penmaenmawr, and reconstruction of same in reinforced concrete, for U.D.C. J. Parry-Hughes, engineer and surveyor. Dep. £2 2s.

APRIL 11.
Alton.—Reservoir.—Reinforced concrete covered service reservoir and laying of a 9-in. main, etc., for U.D.C. H. Rolfe & Son, consulting engineers, Abbey House, Victoria-st., S.W.1. Dep. £5 5s.
Canvey Island.—Improvements.—Construction of sluice in river wall in Benfleet Creek, for Commissioners. P. J. Pease, South Benfleet.

APRIL 12.
Southampton.—Bridge.—Hinged footbridge and supporting tanks, etc., and erection thereof at Royal Pier, Southampton, for Harbour Board. E. Cooper Poole, engineer to the Board.

APRIL 14.
Garriston.—Water Supply.—Providing and laying 2,300 lin. yds. of 3-in. steel pipes or alternatively cast-iron pipes, 500 lin. yds. galvanised 1-in. dia. wrought-iron pipes, and 300 lin. yds. galvanised ¾-in. dia. wrought-iron pipes, together with the construction of intake and storage tanks and appurtenant works. P. J. Rodwell, chartered engineer, 37 and 38, Prudential-buildings, Park-row, Leeds. Dep. £1 1s.

APRIL 20.
London.—Bridgework.—93 tons, for India Store Dept. Director-General, Belvedere-rd., S.E.1
Muirkirk.—Water Supply.—Forming an intake, laying a 5-in. cast-iron conduit about 275 yds. long excavating about 16,000 cubic yds. of material to form an extension to existing reservoir, laying and jointing about 800 yds. of 5 and 4 cast-iron pipes for additional water supply to village, for D.C. of Ayr C.C. J. B. Brodie, 141, West George-st., Glasgow. Dep. £2.

APRIL 21.
Todmorden.—Reconstruction. — Sewage disposal works at Sandbed, for T.C. H. Crabtree, B.E. Dep. £2.

APRIL 24.
Lochaber.—Steelwork.—Structural steelwork for power house and factory buildings, for North British Aluminium Co. Secretary, Adelaide House, King William-st., London.

ROAD, SEWERAGE, AND WATER WORKS.

APRIL 9.
Argyll.—Road.—Construction of second section of new Tyndrum-Ballachulish road, from Bridge of Orchy over Black Mount and Rannoch Moor, to the vicinity of Kingshouse, for C.C. James M'Gregor, chief engineer, Ballachulish East, Argyll. Dep. £3 3s.
Innerleithen.—Sewer.—Construction of 120 yds. roadway and footpaths, 32 ft. wide, with kerbs and channels, and 230 lin. yds. fireclay sewer, 9 in. in diameter, in Horsburgh-st., for T.C. C. Miller, B.S.

APRIL 10.
Cottingham.—Surfacing.—Re-forming and resurfacing with slag tarmacadam of about 9,000 super yds. of carriageway in New Village-rd., and also for widening west end of South-st. of about 300 super. yds. of carriageway and footpath, and the necessary works in connection therewith, for U.D.C. J. H. Hanson, S.
Crewe.—Making-up.—Also sewering of back passages (1) between Swinnerton and Culland-sts., (2) rear of 164-178, Nantwich-rd., (3) rear of 88-124, Alton-st., (4) rear of 113-129, Market-st., (5) rear of 1-43, Somerville-st., (6) rear of 329-457, West-st., being approximately 258, 160, 305, 150, 315, 970 lin. yds. respectively, for T.C. E. G. Timbrell, B.E. and S. Dep. £2 2s.
Enfield.—Making-up.—Of Osborne-rd., Brimsdown, Enfield-highway, for U.D.C. H. R. Crabb, S. Dep. £2 2s.
Gateshead.—Roads.—Flagging Glenbrooke-terr., Low Fell, Lindum-rd., Holyoake-gardens, for C.B. F. H. Patterson, B.E.
Kent.—Sewer.—1,920 yds. of concrete tube sewer, 18 in. and 15 in. diameter, together with manholes and other incidental works, in parishes of Chislehurst and Orpington, for West Kent Sewerage Board. A. E. Scott Murray, engineer. Dep. £3 3s.
Mitcham.—Making-up.—In concrete of roads upon the Council's housing estate, Swains Farm, for U.D.C. S.
Waltham Abbey.—Mains.—Laying and jointing of cast-iron mains, together with connections and contingent works:—2,420 lin. yds. of 6-in. main in Wood Green-rd., Horseshoe-hill and New-road and 833 lin. yds. of 7-in. main in Bury-rd., for M.W.B. Chief Engineer. Dep. £5.

APRIL 11.
Antrim.—Sewerage.—Construction of about 912 lin. yds. of 9-in. sewer in High-st., also about 390 lin. yds. of 12-in. sewer in six mile water at rear of houses on south side, of High-st., for R.D.C. W. D. R. Taggart, C.E., Scottish Provident-buildings, Belfast. Dep. £2 2s.
Herne Bay.—Making-up.—Of (1) West Cliff-drive, and (2) West Hill-rd., for U.D.C. B. J. Wormleighton, E. and S.
Heston and Isleworth.—Making-up.—Of King's-av., for U.D.C. J. G. Carey, E. and S. Dep. £2 2s.
Littlehampton.—Main.—Laying of approximately 2,600 lin. yds. of 10-in. and 80 yds. of 4-in. water main, with necessary branches, valves, hydrants etc., for U.D.C. A. Shelley, C.
Widnes.—Making-up—Of Christie-st., Harris-st., passage rear of 5-39 and side of 39, Christie-st.; passage rear of 70, Halton View-rd., rear of 2-14, Christie-st., and part side of 14, Christie-st.; passage rear of 54-60, Halton View-rd., rear of 1-27, Harris-st., and side of 27, Harris-st.; passage rear of 72-82, Halton View-rd.; passage between 23 and 25, Christie-st.; passage between 14 and 16, Christie-st.; passage rear of 2-22, Harris-st., and sides of 2 and 22, Harris-st., for T.C. B.E. and S.

APRIL 12.
Bute.—Widening.—Of Ascog-rd. at Millbank-corner, for D.C. Gilbert Thomson & Son, engineers, 164, Bath-st., Glasgow. Dep. £1 1s.
Leeds.—Paving.—Kerbing and paving channels in Middleton Park-av. (extension); kerbing and flagging of footpaths and macadamising carriageways in Oakhurst-mount, Back Winston-gardens, Union-rd. and tar paving of footpaths on Wyther housing estate, for T.C. E. W. Cockerlyne, Highways Engineer.
Wilts.—Reconstruction.—Re-aligning, strengthening and surfacing with asphalt total length of approximately 10 miles of main road, for C.C. H. S. Ganderton, C.S.

APRIL 13.
Hazel Grove and Bramhall.—Making-up.—Also various street and sewerage schemes, for U.D.C. S. Dep. £2.
Northam.—Sewerage.—Construction of sewerage works, in Myrtle-st., Appledore, for U.D.C. W. G. Champion, S. Dep. £2.
Westbourne.—Pipes.—Supplying and laying of 3-in. cast-iron pipe, together with 6 hydrants and 3 stop valves, complete with hydrant tees, brick boxes, cast-iron surface covers and including cutting, throughout whole length of Broad-rd., Nutbourne, for R.D.C. J. W. Loader Cooper, C.

APRIL 14.
Inverness.—Surfacing.—With tarmacadam of road between Spey-bridge, Grantown-on-Spey, and Nethy Bridge, a distance of 4¾ miles or thereby, for C.C. A. M. Grant, R.S.

APRIL 16.
Yeovil.—Mains.—Laying of 3½ miles of 12-in., 9-in. and 6-in. water mains, between Evershot and Cattistock farm, for T.C. A. J. Price, Water Engineer.

APRIL 17.
Prestwich. — Making-up. — Also sewering and draining of Lichfield-drive, for U.D.C. M. A. Piercy, E. and S. Dep. £1 1s.

APRIL 18.
Bushey.—Tarpaving.—Of footpaths, Herne-rd. (part), and Melbourne-rd. (part), for U.D.C. E. R. Ryder, E. and S.
Mexborough.—Main.—For (a) laying and jointing of approximately 3,700 yds. of 8 in. cast-iron spigot and socket water main, together with valves and accessories, and (b) construction of reinforced concrete collecting chambers, for U.D.C. J. B. Feltham, Engineer and Manager. Dep. £1 1s.

APRIL 21.
Coupar Angus.—Resurfacing.—Tarmacadam resurfacing etc., Queen-st., for T.C. J. A. R. Macdonald, B.S.

NO DATE.
Disley.—Roads.—Laying of roads and drains to Dane Bank estate, for Dane Bank Estate Co., Ltd. P. A. Hinchcliffe, F.R.I.B.A., architect and surveyor, 14, Regent-st., Barnsley.
Durham.—Levelling.—Children's playing ground at Langley-pk. colliery, for Miners' Welfare Committee. Jno. Wilson Hall, secretary, Langley-pk., Durham.
Ticehurst.—Tar Spraying.—176,000 sq. yds. of roads, for R.D.C. F. Laurens, S., Western-rd., Wadhurst.

Auction Sales, Tenders, etc.

APRIL 17.
London, N.—Joseph Hibbard & Sons. Without reserve. By order of Messrs. Boyd, Ltd., surplus stock, upon the premises, St. Ann's Works, St. Ann's-rd., surplus stock; plant and equipment of pianoforte manufacturers, saw mill plant, etc. Auctioneers, 15, Newington-green, Islington, N.16.
***South Ealing.**—J. Trevor will sell re Condual Construction Co., Ltd., by order of the Receiver, Sir Harold Moore, F.C.A., without reserve, at Pope's-lane, South Ealing, surplus building material of the Ealing Council village scheme. Auctioneer, 23, Coleman-st., E.C.2.

MAY 10.
***Uxbridge.**—Constable & Maude will sell, by direction of George Rose, Esq., in 28 lots, at the Chequers Hotel, Uxbridge (unless previously sold privately), portions of the Harefield-place estate, Middlesex, also mansion, in all about 700 acres. Auctioneers, 2, Mount-st., Grosvenor-sq., W.1.

APRIL 18.
London.—Knight, Frank & Rutley, at Hanover-sq. Estate Room, "The Belmont Estate." Freehold building land, cottages and residence; land extends to about 280 acres. Auctioneers, 20, Hanover-sq., W.1.
London.—Knight, Frank & Rutley will sell in the Hanover-sq. Estate Room, Elmgate Gardens estate, comprising freehold building land, area about 14½ acres. Auctioneers, 20, Hanover-sq., W.1.

APRIL 19.
London.—Grant Stevenson & Co. will sell (unless previously disposed of by private treaty), at "The Compton Hall," Compton-rd., Wimbledon, in 14 lots, residence, stabling and 12 building plots. Auctioneers, Avispado House, Holland Park-av., W.11.

APRIL 24.
London.—Hampton & Sons, at St. James' Estate Rooms, 20, St. James'-sq., S.W.1. Freehold building estate at Potters Bar, Middlesex. Auctioneers, 20, St. James'-sq., S.W.1.

MAY NEXT.
Hastings.—Berryman & Gilkes. By order of the court. Residential estate, 4 bungalows, 6 cottages, etc., to be sold by auction or privately. Auctioneers, 2, Hans-rd., S.W.3.

Public Appointments.

APRIL 11.
London.—Secretary to the Institution of Municipal and County Engineers. J. W. Dudley Robinson, secretary, 92, Victoria-st., Westminster, S.W.1., endorsed "Secretaryship."

APRIL 12.
***Bodmin.**—Clerk of Works required in connection with the restoration of the Foster Hall at the Mental Hospital, for a period of six months. County Architect, County Hall, Truro.
Greenwich.—Depot Clerk on the Supernumerary Staff required by the Greenwich B.C. Frederick J. Simpson, T.C.

APRIL 14.
London.—Temporary asst., quantity surveyors. —(a) One Grade I. assistant, (b) three Grade II. assistants. Under Secretary for Mines, Establishment Branch, Mines Dept., Dean Stanley-st., London, S.W.1.
London.—(a) Grade I. architectural draughtsman, (b) Grade II. architectural draughtsman, (c) junior architectural draughtsman. Temporary appointments. Under-Secretary for Mines, Establishment Branch, Mines Dept., Dean Stanley-St., London, S.W.1.
Westminster.—Third assistant draughtsman and junior clerk required by the Westminster City Council, in the Works Dept. John Hunt, Clerk, Westminster City Hall, Charing Cross-rd., W.C.2
Wolverhampton.—Architect on the staff of the Borough Engineer, required by the Wolverhampton C.B. F. E. Warbreck Howell, T.C., Town Hall.

APRIL 16.
***London.**—Visiting teachers required for two evenings weekly, one wood-carving, gesso and gilding (water and oil) for two afternoons and evenings weekly. Education Officer (T.1a), The County Hall, Westminster-bridge, S.E.1.

APRIL 17.
***Bromley.**—Building Inspector required by the Bromley R.D.C. Leonard O. Wall, Clerk, Council Offices, Crofton Pound-hill, Orpington.

APRIL 30.
***London.**—Temporary Architectural Assistant in dept. of the Chief Engineer of the Metro. Water Board. Henry E. Stilgoe, M.Inst.C.E. Offices of the Board, 173, Rosebery-av., E.C.1.

PROPOSED NEW BUILDINGS & OTHER WORKS*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works at the time of publication have been actually commenced. Abbreviations: T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; B.C. for Borough Council; P.C. for Parish Council; M.H. for Ministry of Health; M.T. for Ministry of Transport; C.B. for County Borough; B. of E. for Board of Education; M.A.B. for Metropolitan Asylums Board; and M.W.B. for Metropolitan Water Board; Borough Surveyor, B.S.; Borough Engineer, B.E.; District Surveyor, D.S.; Clerk, C.; Town Clerk, T.C.; County Engineer, C.E.; County Surveyor, C.S.; County Architect, C.A.; Surveyor, S.; Engineer, E.; Borough Architect, B.A.; Architect, A.

Bath.—T.C. recommend central heating at Banqueting Room, Guildhall, at £300, by City Electrical Engineer.—Art and Technical Committee recommend City Council (1) to provide new secondary school for boys, and (2) to enlarge present Technical College.

Beddington.—U.D.C. passed plans:—Crichton-av., 4 houses, for N. A. Harvey, 28, London-rd.; London-rd., 3 shops near Hackbridge Triangle, for E. Grout, 6, Link-rd.; Wolseley-rd., 3 garages, for C. Gosling, 30, Wolseley-rd.; London-rd., 100 houses, Elm Grove estate, for C. R. Leech, "Thursley," Butter-hill, Carshalton.

Bilsdens.—A sum of £2,500 been recommended by Essex C.C. for reconstruction of bridge.

Bishops Stortford.—U.D.C. agreed to application being made to M.H. for sanction to borrow £9,100 for erection of proposed 24 houses on Dunmow-rd. estate.

Blackpool.—Lancashire Construction Co., Ltd., Field-st. Saw Mills, secured site having frontages to Marton-drive, where they propose to erect shops and houses. Messrs. R. Gorst & Son, architects and surveyors, 7, Birley-st.—Enlargement of St. Paul's Church, Marton, is contemplated, by addition of chapels and reconstruction of east end of nave. F. R. Freeman, architect, 21, Wood-st., Bolton.

Braintree.—A sum of £2,171 been recommended by Essex E.C. for additional laboratory accommodation at County High school.

Bridlington.—Plans passed:—F. W. Woolworth & Co., Ltd, alterations and additions to 10 and 11, Prince-st.; Walter, Son & Field, new chancel tower, Vestry and Parish Hall, Cardigan-rd., and St. James'-rd., for Vicar and Churchwardens of Emmanuel Parish Church; Oliver & Linnell, 6 houses, Bvass-av., for A. L. Bacon; C. F. Johnson, 6 houses, Hamilton-rd., for J. E. Wray & Son.

Bromley.—T.C. passed plans: 59 houses, Palace-view and Muiray-av., H. F. Thoburn; 10 lock-up garages, 5, London-rd., A. Frampton.

Brookwood.—Plans for the £65,000 additions—referred to in last week's issue—to the Brookwood Mental Institution are being prepared by F. J. Hodgson, of High-st., Guildford.

Caistor.—R.D.C. adopted scheme for building additional 16 houses.

Chester.—City S. is inviting tenders for erection of 3 houses and 12 shops at Handbridge. M.H. approval been obtained.—M.H. given formal sanction to borrowing £400 for provision of public sanitary conveniences in George-st. and Cattle Market.—Town Clerk been instructed to make inquiries with a view to purchase of further land for housing purposes in Eaton-rd. district.—Town Clerk is also to enter into negotiations for acquisition of additional land for erection of new pump house.—Tenders are to be invited for erection of roof over Mug Market from plans by City S., and application is to be made to M.H. for sanction to borrow necessary monies.—Formal sanction been received from M.H. to borrowing £570 for erection of houses on Eaton-rd. estate.

Coulsdon and Purley.—Surveyor to U.D.C. is reported that preparing plans and specification for 20 three-bedroom type houses on Farleigh-rd. site, and provision of lighting and heating.

Devizes.—R.D.C. are to erect 14 houses. Council's Architect, Mr. T. V. Trumper.

Dunton.—Essex E.C. recommend erection of new Council school at £4,655.

* See also our List of Contracts, Competitions, etc.

East Barnet.—U.D.C. passed plans: 4 houses, Northumberland-rd., for F. G. White & Sons; 20 houses, Ryhope-rd., Brunswick-park, for Carr & Sons; 6 houses, Brunswick Park-rd., for F. W. Allwright; workshop and store, in Church Hill-rd., for H. H. Marsh; 12 houses, Long-st., for — Cox; hall, St. Augustine's Presbyterian Church, New Barnet.

Edmonton.—U.D.C. passed plans:—T. Bright, pavilion at the tennis courts at rear of The Orchard; F. A. Halls, 8 houses in King Edward-rd.; Metropolitan Electric Tramways, Ltd., canteen additions at the depot in Tramway-av.; E. Yates, 4 houses in The Meadway Bungalows in Manorway, Bush Hill Park.

Egham.—Plans passed by U.D.C.: bungalow with shop at Station-rd., for H. Atkins; additions to "Fairfield," Chertsey-lane, The Hythe, for E. Judge.

Fleet.—U.D.C. approved plans for sub-station for Aldershot Gas Co. in Elvetham-rd.

Fleetwood.—Plans under consideration for erection of 12 parlour-type houses on Warren Farm estate municipal housing site.

Grays.—Essex E.C. recommend new open-air school at £1,365.—Committee recommend £6,040 for hostel and headmistress residence at Palmer's Endowed School for Girls.

Harold Court.—Essex C.C. recommend £1,015 for additional building work at sanatorium.

Hendon.—Council building 70 houses in Clitterhouse-lane at £35,000.

Herne Bay.—U.D.C. passed plans:—Two pairs of semi-detached houses, Selsea-av., Hobbs Bros.

Heston and Isleworth.—U.D.C. passed plans:—Legassick & Wright, 106 houses, Rose Farm estate, Jersey-rd.; W. J. Harris, 4 houses, The Drive, Isleworth; R. T. Warren, 42 houses, Devon-waye; J. E. Frankcom, 24 houses, Hartham-rd.; S. W. Cranfield, alterations, Hounslow drill hall; E. Hiscock, Ltd., 4 shops, Hanworth-rd.; P. H. Watkins, 8 houses, Great West-rd.; P. H. Watkins, 14 houses, "The Green," Heston; W. J. Johnson, 3 houses, Kingsley-av.; E. W. Button, 4 houses, Staines-rd.; W. J. Harris, 52 houses, The Drive, Isleworth.

Heywood.—T.C. passed plans:—Chas. Littler, alterations and addition of balcony, Picturedrome Cinema, Market-st.; Bury Brewery Co., Ltd., King's Arms, Market-place; Phoenix Brewery Co., Ltd., Freemasons' Arms, Market-place; T. Heywood, 8 houses, Rutland-st.

Hoyland.—West Riding C.C. have given notice for public school at Hoyland for 450 children, and the enlargement of the Hoyland Elsecar School for 120 more children.

High Wycombe.—T.C. passed plans: 2 houses, Desborough-av., for W. Abbott; additions to factory, Desborough Park-rd., for Castle Bros.; 2 houses, London-rd., for Mrs. E. Smith; 2 houses, Eaton-av., for Soden and Stone; 2 houses, Eaton-av., for Fletcher and Soden; additions to factory, Denmark-st., for R. Howland & Son; 2 houses, King's-rd., for F. Timberlake; additions to chair factory, Spring-gardens, for E. Gomme; chair factory, Leigh-st., for W. Birch, Ltd.; additions to chair factory, Kitchener-rd., for Birch and Alpe.

Hull.—Plans have been prepared by the architects' dept. of the Y.P. Bank, Ltd., at Leeds, for branch banking premises in Princess-avenue.

Kingston-on-Thames. — T.C. passed plans:—Kingston District Hospital, Kingston-hill; medical superintendent's house; W. J. Daws, London, S.W.1; Queen's-rd., 12 garages; J. Brewerton, 84, Clifton-rd.; rebuilding 30, 32, Thames-st., D. G. Marsh, 38, Chancery-lane, W.C.2; London-rd., 6 lock-up shops; H. R. Ellis, Surbiton.

Knutsford.—Board of Management of District War Memorial Cottage Hospital, are proposing to make extensions to Institution. Architect, Francis Jones, F.R.I.B.A., 178, Oxford-rd., Manchester.

Leeds.—Corporation are to erect new elementary school in Templenewsam.

Leicester.—Water Committee of T.C. recommend construction of new service reservoir to supply Braunstone housing estate, at £18,994.

Letchworth.—U.D.C. passed plans:—J. L. A. White, 8 houses, Icknield Way; P.R.H.A., Ltd., 5 garages, Norton; F.G.C., Ltd., factory, Icknield Way; Garden City Press, Ltd., additions to factory, Pixmore-av.

Leyton.—Essex C.C. recommend £19,633 for reconstruction of Lea Bridge-rd. Other work at £22,470 been recommended by C.C. for same district.

Liverpool.—Finance Committee recommend that, subject to grant being obtained from Unemployment Grants Committee, and also subject to sanction of M.H. to borrowing necessary amount, Health Committee be authorised to take necessary steps to reclaim a portion of foreshore of Mersey at Otterspool, and to construct a river wall with temporary end embankments at £100,000—as part of scheme for provision of promenade or marine parade facing Mersey. Watch Committee are to erect police and fire station, including twenty-four dwelling-houses for staff on site in Rose-lane, Mossley Hill, at £53,000.—Wavertree Presbyterian Church of England treasurer received £12,000 cheque anonymously towards £15,000 fund to build a church.

London (Bermondsey).—L.C.C. recommend borrowing by Bermondsey B.C. of £5,000 for housing purposes.

London (Greenwich).—L.C.C. recommend borrowing by B.C. of £1,639 for housing purposes.

London (Wandsworth).—L.C.C. recommend borrowing by B.C. of £26,610 for making-up streets within borough.

Maltby.—U.D.C. are to acquire land off Grange-lane for 32 houses.

Manchester.—G. W. Boardman, 72, Church-st., Newton Heath, is to erect 40 houses on Wilton-rd., Crumpsall.—Montague Burton, Ltd., clothiers, Leeds, are proposing shops, billiards hall, etc., at Oxford-rd. and Grey-st., Manchester. Plans by H. Wilson, A., Roundhay, Leeds.

Mansfield.—T.C. passed plans:—Mrs. A. M. Stokes, 7 shops in arcade off Leeming-st.; B.G., additional male and female wards, Stockwell-gate; J. G. Harrison, 2 houses, Southwell-rd.

Margate.—E.C. submitted plans of proposed new laboratory at Boys' Central School, and recommended that same be approved, and application be made for sanction to raising of loan of £1,205.—Housing Committee submitted plan, specification, and estimate, prepared by B.S., for constructing dwarf brick wall, with necessary new oak posts and oak open pale gates, to front gardens of 12 of Corporation's houses abutting on Ramsgate-rd., between Connaught-rd. and Ulster-rd., for improving appearance. Council approved this recommendation.

Mitcham.—U.D.C. passed plans:—Wates, Ltd., 668, High-rd., 6 houses, 6 shops and lock-up shop, Grove-rd.; Thoraton Heath pavilion, Galpins-rd. Sports Club, Ltd.

Nottingham.—Nottingham's proposed market reconstruction scheme, if carried out, will cost £28,000.

Olford.—T.C. passed plans:—J. W. Moore & Son, 3 bungalows and conservatories, 42, Egerton-gardens, 41/43, Gyllnygdune-gardens; A. Smith, 10 shops and dwellings, 1 to 1, Redbridge-lane, and 243/249, Beehive-lane, and lock-up garages; T. Anders, 16 houses, 25/55, Church-rd.; W. H. Lewis, 16 bungalows, 1/15, 2/16, Chepstow-crescent; P. G. Ashton, lock-up garages, Grove-farm, High-rd., Chadwell Heath; E. Meredith, alterations to 70/80, High-rd.; W. Longworth & Co., 2 houses, 160/162, Auckland-rd.; C. Fryatt, 10 houses, 15/23, Church-rd., 16/24, Newbury-rd.; United Dairies, Ltd alterations to boundary wall rear of 273/275, High-rd.; A. P. Griggs, 6 houses, 17/21, Lochester-gardens, 18/22, Exeter-gardens; T. Anders, 5 garages, 53/61, Woodford-av.; T. Anders, 23 houses, 18/36, and 17/41, Derwent-gardens; W. T. Markham, 3 houses, 90, 90a, and 92, Aberdour-rd.

Use

"OUT-OF-THE-WAY" AND "AROUND-THE-CORNER"

SLIDING DOOR FITTINGS

for your client's garage

Send for our new Catalogue S.D.28.

GEO. W. KING, LTD.

Windmill Lane, Stratford, London, E.15.

'Phones: Maryland 2703-4. 'Grams: "Agrikinger," London.

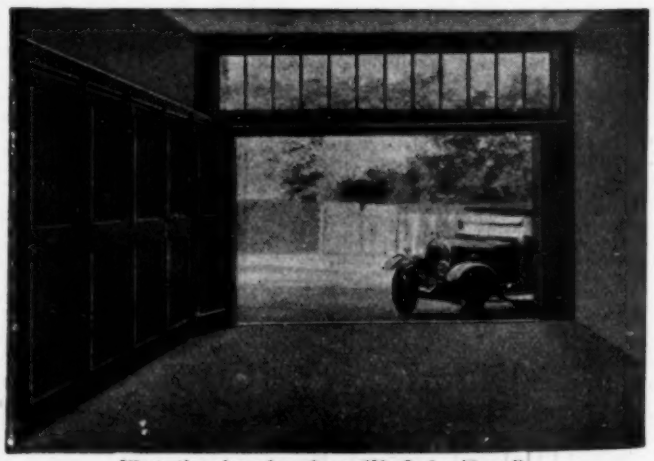


Illustration shows how doors slide flush with wall.

Ormskirk.—Tarleton Wesleyans are considering scheme to reconstruct present school or build new one.

Plymouth.—C.B. appointed committee to consider site for new secondary school for girls at Devonport.

Preston.—B.S. been instructed by Watch Committee of T.C. to proceed with erection of police station in Water-lane.

Rochdale.—Rochdale and Manor Brewery Co., Molesworth-st., are to rebuild Bridge Inn, Wellith-lane. Plans by W. Johnson & Sons, 27, Oldham-rd., Miles Platting, Manchester.

Romford.—Essex E.C. recommend £623 for adaptation of Romford Special (M.D.) school.—Committee also recommend £901 for enlargement of Mawney-rd. school.

St. Helens.—D.C. approved plans for 12 houses by Council at Great Preston-rd. and six at St. Michael's-rd., St. Helens.

Salford.—City Council recommend borrowing £29,850 to cover expenditure in connection with erection by Corporation of 66 houses on Littleton-rd. housing estate.

Sheffield.—Tennant Bros., Ltd., Exchange Brewery, propose £7,000 hotel, having frontages to Chesterfield-rd. and Norton-lane, Greenhill. Plans by Gibbs, Flockton & Gibbs, FF.R.I.B.A., 15, St. James'-row.—Carver-st. Wesleyan Circuit propose £7,000 chapel to seat 430 at Bent's Green. W. J. Hale, F.R.I.B.A., 13, St. James'-row, to prepare the plans.

Shrewsbury.—T.C. approved recommendation of E.C. for approval scheme for erection on racecourse of senior boys' school for 320 and a senior girls' for 240 and for re-organising of Wyle Cop Council and Coleham Council school as junior schools. The estimated cost of new schools, which are to be of open-air type, is £19,600.

Slough.—U.D.C. passed plans: 10 houses, Bradley-rd., for A. C. Wilmot; house in Dolphin-rd., for — Pusey.

South Benfleet.—Essex E.C. recommend £100 for renovation and improvements to Council school.

Southend-on-Sea.—C.B. passed plans:—Additions to model dairy, London-rd., Howard's Dairies, Ltd.; 8 houses and 8 garages, Sackville-rd., C. Wingrave, junr.; amended plan of 3 houses, Fairfax-drive (near Electric-av.), F. A. Easty; 4 houses, Tunbridge-av., E. Davey; amended plan of factory, Baltic-av., Hancock Bros.; 24 flats, Station-rd., T. J. Dennis; 11 houses and 1 garage, Rylands-rd., F. Cook; 6 garages, rear of Bournemouth Park-rd., A. T. Grimwade; 6 houses, Leigh-gardens, N. Morris; 3 houses, Recreation-av., Bass & Smee; 4 houses and 4 garages, Ditton Court-rd., F. W. Taylor; 6 houses, Ennismore-gardens, W. G. Sloman; 2 houses and 2 garages, Mount-av., W. A. Schrier; 6 lock-up garages and w.c., rear of 22, Milton-rd., Mrs. G. Liddle; 4 houses, Leigh-gardens, R. W. Walker.

Southgate.—U.D.C. passed plans:—Morter & Foster, 5 houses and garages, Green Moor-link; L. Ambler, bank premises, corner of Green-lanes and Fords-grove; F. F. Tomlin, 8 houses with garages, North Circular-rd.; G. W. S. Ingram, 6 houses, Bourne-hill.

Stratford.—Essex C.C. recommend £12,438 for reconstruction of Stratford St. Mary bridge.

Sunderland.—B. of E. asked C.B. for plans of new elementary schools, to accommodate 1,480 pupils, and of the new Central school, to accommodate 480 pupils, to be erected on Newcastle-rd. site.

Swansea.—C.B. are considering various sites for new electricity station.—B.A. is to submit plans and estimates for alterations at abattoirs.—Application is to be made to M.H. for sanction to borrow £21,306 12s. 4d. for erection of the 50 houses.—C.B. recommend application to M.H. to borrow further moneys for completing purchase of land for and erection, equipment and furnishing of Joint Mental Hospital for County Boroughs of Swansea and Merthyr respectively at Cefn Coed Cockett.—Plans passed: 4 houses, Pentregethin-rd., J. Hayward; 3 houses, Bowen-st., J. O. Watkins; sub-station, Pier-st., Electricity Committee; bank, St. Helen's-rd., Lloyds Bank, Ltd.; 11 houses, Baglan-st., A. E. Wright; rebuilding, 29, Waterloo-st., J. Plosker & Co.

Tynemouth.—T.C. passed plans:—4 houses, Houghton-av., by F. R. N. Haswell & Son, for J. & J. Robison; 3 houses, Chirton Green estate, by F. R. N. Haswell & Son, for Chisholm & Co.; shops and flats, Chirton Green estate, by F. R. N. Haswell & Son, for Chisholm & Co.

Walthamstow.—U.D.C. passed plans:—14 houses, Pentire-rd., E. E. Wire; 14 garages, rear 145, Orford-rd., J. R. Day; cold storage, 177, Hoe-st., W. H. Bass; factory and lavatories, Wolsey-av., W. Penfold; addition, "Gardener's Arms," Boundary-rd., S. A. S. Yeo; factory extension, Gainsford-rd., H. S. Couchman & Son; 7 garages, Pendlestone-rd., H. Evans; 4 houses, Aveling Park-rd., J. W. Warboys.

Wembley.—Middlesex C.C. proposes to spend £16,862 to prevent flooding of River Brent at Stonebridge, Wembley.

Woodford.—Essex C.C. recommend £28,270 for road reconstruction in Woodford district.

Worthing.—T.C. passed plans:—6 houses and garages, Woodlea-rd. and Parkfield-rd., A. Churcher; 3 houses, Southcourt-rd., F. C. Tyler; 7 lock-up garages in yard rear of High-st., F. G. Searle, per J. E. Lund; 8 houses, Homefield-rd., L. Robertson, per A. T. W. Goldsmith; amended plan 4 houses, Boundary-rd., A. C. Patching & L. Waterman per A. T. W. Goldsmith; new street, West Wallace-av., E. M. Rodocanachi; 4 lock-up garages rear of flats, Selden-rd., W. J. Webb.

York.—T.C. passed plans:—York Wine and Spirit Co., Ltd., premises, Blake-st.; Tadcaster Tower Brewery Co., Ltd., additions, "Britannia Inn," Heworth; J. J. Hunt, Ltd., additions, "Londesbro' Arms," Petergate; Saml. Smith, Ltd., additions, "Trafalgar Bay" Inn, Nunnery-lane.

NEW COMPANIES

THE particulars quoted below have been compiled by Messrs. Jordan & Sons, Ltd., Company Registration Agents, of 116 & 117, Chancery-lane, W.C.2, from the documents available at the Companies' Registry.

WALTER WITHERS & SON, LTD. (226,946). Registered December 29. 15, Fairfield-street, Wandsworth, S.W.18. Contractor, builder, upholsterer, electrical and sanitary engineer, etc. Nominal capital, £2,500.

PETER LIND & Co., LTD. (226,995). Registered December 31. 2, Central Buildings, Westminster, S.W.1. Civil engineers and contractors carried on at Westminster as "Peter Lind & Co." Nominal capital, £45,000.

W. E. HUGHES, LTD. (226,978). Registered December 30. 400a, Borough-road, Birkenhead. Builders, building contractors, etc. Nominal capital, £2,000.

HEWITT & SEWELL, LTD. (226,960). Registered December 30. 30, Bush-lane, Cannon-street, E.C.4. Builders and decorators, etc. Nominal capital, £3,000.

CHOWNS, LTD. (226,898). Registered December 28. 63, Edinburgh-road, Northampton. Builders and contractors. Nominal capital, £10,000.

METAL AND GLASS, LTD. (226,965). Registered December 30. Contractors for and dealers in building materials of all kinds, etc. Nominal capital, £2,000.

SKINNER SONS & Co., LTD. (227,294). Registered January 12. 28, Sheen-lane, East Sheen, S.W.14. Builders, contractors, etc. Nominal capital, £1,000.

J. & R. BELL, LTD. (227,261). Registered January 11. Builder and contractor. Nominal capital, £20,000.

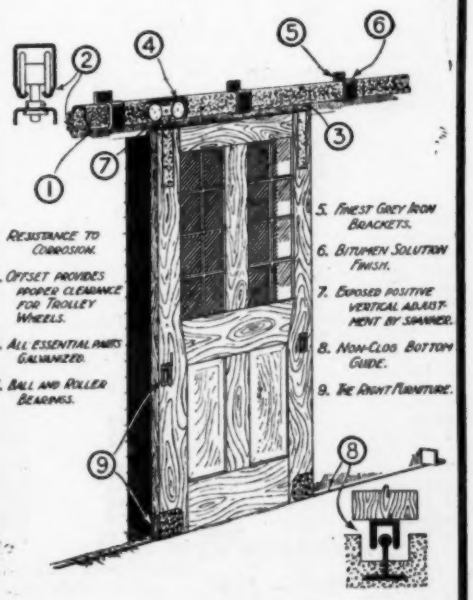
ROBERT BRETT & SONS, LTD. (227,266). Registered January 11. General contractor, quarry owner and timber merchant. Canterbury. Nominal capital, £25,000.

SLIDING DOOR GEAR

FOR FACTORIES, GARAGES, SCHOOLS, ETC.

Nine essential features of "Henderson" Door Gear

TRADE MARK



1. RESISTANCE TO CORROSION.
2. OFFSET PROVIDES PROPER CLEARANCE FOR TROLLEY WHEELS.
3. ALL ESSENTIAL PARTS GALVANIZED.
4. BALL AND ROLLER BEARINGS.
5. FINEST GREY IRON BRACKETS.
6. BITUMEN SOLUTION FINISH.
7. EXPOSED POSITIVE VERTICAL ADJUSTMENT BY SPANNER.
8. NON-CLOG BOTTOM GUIDE.
9. THE RIGHT FURNITURE.

WRITE FOR BOUND CATALOGUE B26 TO

P. C. HENDERSON, LIMITED.

BARKING, ESSEX. PHONE: GRANGEWOOD 0247

TENDERS

Communications for insertion under this heading should be addressed to "The Editor," and must reach him next week not later than Tuesday evening.

- *** Denotes *accepted*.**
- **† Denotes *provisionally accepted*.**
- **‡ Denotes *recommended for acceptance*.**
- **§ Denotes *accepted subject to modifications*.**

Bath.—Structural alterations at the Corn Market buildings, for the E.C.:—

*J. Long & Sons, Ltd.	£419

Bath.—Repairs to farm buildings at Charmy Down farm, for the T.C.:—

*W. H. Moss	£105

Beckenham.—School in Kent House-road, for the U.D.C. Mr. S. Burgoine, A.R.I.B.A., architect. Quantities by Mr. David Dakers:—

G. Green (Beck), Ltd., Beckenham	£15,755
C. H. H. Kenworthy, Herne Bay	15,461
E. D. Winn & Co., Ltd., London	15,252
A. E. Symes, Ltd., London	15,000
J. E. Billings & Co., Ltd., London	14,999
H. & J. Taylor, London	14,947
F. J. Moreton & Son, W. Norwood	14,931
G. E. Everitt & Sons, Ltd., Croydon	14,925
A. Roberts & Co., Ltd., London	14,923
J. Crewdson, Horley	14,864
F. & A. Bayntum, London	14,787
Truett & Steel, Ltd., Thornton Heath	14,775
Hill & Gurr, Bromley	14,755
Galbraith Bros., Ltd., London	14,575
Leslie & Co., Ltd., London	14,563
John Garlick (1910), Ltd., London	14,500
C. H. Gibson, Ltd., Croydon	14,487
Perrys (Ealing), Ltd., Ealing	14,484
Wilson Lovatt & Sons, Ltd., Wolverhampton	14,477
Burnand & Pickett, Ltd., Wallington	14,377
R. J. Trustcott, London	14,147
Andrews & Andrews, Beckenham	13,995
Wm. Griffiths, Sons & Cromwell, Ltd., London	13,982
George Coe, Chistlehurst	13,750
Norman Smith & Son, East Maidstone	13,566
E. A. Russell, London	13,360
*J. Elliman & Son, Ltd., Beckenham	13,323

Blackburn.—School at Roe Lee, for the T.C.:—

*J. Cronshaw & Sons, Ltd., Blackburn	£12,837

Cadishead.—Extensions to the Cadishead Conservative Club:—

*Taylor & Whittaker, Cadishead.	

Cardiff.—Improvements.—The south-east corner of Llandaff Bridge over the River Taff, for the T.C. City Engineer:—

F. J. Thomas & Sons, Cardiff	£650 0
F. C. Williams, Cardiff	645 15
Watkin Williams & Sons, Cardiff	606 0
Henry Jones, Cardiff	583 17
S. C. Tavener, Newport	570 0
G. M. White, Cardiff	543 10
Maberley Parker, Cardiff	527 6
*A. G. Collins & Co., Barry	485 14

Caterham.—New boiler house, pump room, etc., for the M.A.B.:—

G. H. Dibblin, Dartford	£10,996
E. Proctor & Sons, London	10,515
‡J. & R. Thompson (London), Ltd., Acton	10,072

Caterham.—Building brickwork settings for boilers and economiser, at the Mental Hospital, for the M.A.B.:—

J. Fox & Sons, London	£2,169 15
H. & T. Danks (Netherton), Ltd., Dudley	2,160 0
Reading Boiler Setting Co., Ltd., Reading	1,967 0
Chimneys, Ltd., London	1,965 0
William Hamer & Sons, Ltd., Bury	1,964 0
D. Adamson & Co., Ltd., Dukinfield	1,880 0
Hewitt & Kellett, Ltd., Bradford	1,869 0
M. L. Sykes, Ltd., Leeds	1,780 0
E. Danks & Co. (Oldbury), Ltd., Oldbury	1,691 0
‡Poulton & Son, Reading	1,650 0

Caterham.—Installation of electric lighting, power and telephones, at the Mental Hospital, for the M.A.B.:—

David Bentley (Leicester), Ltd., Leicester	£19,000 0
Power Contracts, Ltd., London	11,318 4
E. J. Britton & Sons, London	11,032 0
W. E. Hutchinson, Gordon Works, Cardiff	10,950 0
St. James' Electrical Co., London	10,350 0
Parker, Winder & Achurch, Ltd., Birmingham	9,700 0
L. G. Tate & Co., Ltd., London	9,678 0
Alpha Manufacturing & Electrical Co., Ltd., London	9,500 0
H. Tattersall, Rochdale	9,320 5
T. Clarke & Co., Ltd., London	8,600 0
‡Read & Partners, Ltd., London	8,395 0

Caterham.—Laying jointless flooring in certain wards, at the Mental Hospital, for the M.A.B.:—

J. F. Ebner, London	£204 12 11
Carter & Co., London, Ltd., London	188 0 0
T. Anderson, Ltd., Liverpool	188 0 0
E. G. Walters & Co., London	180 0 0
The Wilfley Co., Ltd., London	163 10 0
Monarch Flooring Co., London	158 12 6
Precast Concrete, Ltd., Huddersfield	141 0 0
‡Liotex Trading Co., Ltd., London	139 0 0

M

PRICES CURRENT OF MATERIALS.*

Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry.

BRICKS, &c.

Per 1,000 Alongside, in River Thames up to London Bridge.

	£ s. d.
Best Stocks	4 5 6
Second Hard Stocks	3 19 6

Per 1,000. Delivered at London Goods Stations.

	£ s. d.		£ s. d.
Flettons, at King's Cross	2 12 3	Best Blue Pressed Staffs	9 5 0
Do., grooved for Plaster	2 14 3	Do. Bullnose	9 15 0
Do., Bullnose	3 6 3	Blue Wire Cuts	7 5 0

Best Stourbridge Fire Brick:—

2½ in.	8 11 0	3 in.	10 3 0

GLAZED BRICKS—

Best White Ivory, and Salt Glazed Stretchers	21 0 0	D'ble Str'tch'rs	29 10 0
		D'ble Headers	26 10 0
		One Side and two Ends	30 10 0
		Two Sides and one End	31 10 0
Headers	20 10 0		
Quoins, Bullnose and 4½in. Flats	27 10 0	Splays and Squints	28 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white Other colours. Hard Glaze, £5 10s. extra over white.

BREEZE CONCRETE SLABS.

Delivered London

	s. d.		s. d.
2 in. per yd. super.	1 11	3 in. per yd. super	2 9
2½ in „ „	2 4	4 in. „ „	3 6

	s. d.	
Thames Ballast	10 6	per yd.
Pit Sand	13 9	„ „
Thames Sand	14 6	„ „
Best Washed Sand	14 6	„ „
½ in. Shingle for Ferro-Concrete	12 0	„ „
¼ in.	14 0	„ „
¼ in. Broken Brick	11 6	„ „
Pan Breeze	8 0	„ „

delivered 2 miles radius Paddington.

Per ton delivered in London area in full van loads.

Best Portland Cement. British. Standard Specification. Test £2 13 0 to £2 15 0 46s. alongside at Vauxhall in 80-ton lots.

Ferrocrete per ton extra on above	0 10 0
Super Cement (Waterproof)	4 3 0
Roman Cement	8 15 0
Parian Cement	5 15 0
Keene's Cement, White	5 15 0
„ „ Pink	5 10 0
Plaster, Coarse, Pink	3 0 0
„ „ White	3 12 6
„ Fine	5 12 0
Sirapite, Coarse	3 9 0
„ Finish	3 17 0
Grey Stone Lime	2 10 9
Chalk Lime	2 10 9
Best Ground Blue Lias Lime	1 17 6
Hair per cwt.	2 2 6
Granite Chippings	1 12 0

NOTE.—Sacks are charged 1s. 9d. each and credited 1s. 6d. if returned in good condition within three months carr. pd.

Stourbridge Fireclay in s'cks 37s. 0d. per ton at rly. dp.

STONE.

	s. d.
BATH STONE.—Delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube	2 10
BEER STONE—RANDOM BLOCK— Free on rail at Seaton Station, per ft. cube	2 3
Delivered free on rail Nine Elms, S.R., per ft. cube	3 1½
Selected approximate size one way, 1d. per cubic foot extra; selected approximately three sizes or for special work, 3d. per cubic foot extra.	
PORTLAND STONE.— Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, S. Rly., South Lambeth Station, G.W.R., and Westbourne Park, Paddington, G.W.R., per ft. cube	4 4½
Do. do. delivered on road wagons at above stations, per ft. cube	4 5½
White basebed 3d. per ft. cube extra.	
NOTE.—1d. per ft. cube extra for every foot over 20 ft. average, and ½d. beyond 30 ft.	
HOPTON-WOOD STONE— Delivered at any Goods Station, London.	s. d.
Random blocks, from 10 ft. and over P. ft. cb.	17 0
Sawn two sides „	27 0
Sawn three or four sides „	32 0
YORK STONE, BLUE—*Robin Hood Quality.* Delivered at any Goods Station, London.	
6 in. sawn two sides landings to sizes (under 30 ft. super) Per ft. super	5 6
6 in. rubbed two sides, ditto „	6 0
3 in. sawn two sides slabs (random sizes) „	2 3½
2 in. to 2½ in. sawn one side slabs (random sizes) „	1 6½
1½ in. to 2 in. ditto, ditto „	1 3½
HARD YORK— Delivered at any Goods Station, London. Scappled random blocks Per ft. cube	6 3
6 in. sawn two sides landing to sizes (under 40 ft. super) Per ft super	5 1½
6 in. rubbed two sides, ditto „	6 1½
4 in. sawn two sides slabs (random sizes) „	2 1½
3 in. ditto ditto „	2 10
2 in. self-faced random flags Per yd. super.	8 8

CAST STONE.

Delivered in London area in full van loads, per ft. cube: Plain, 8s 6d.; Moulded, 9s 6d; Cills, 10s. 0d.

WOOD.

GOOD BUILDING DEAL.

Inches.	per stan.	Inches.	per stan.
4 × 11	£30 0	3 × 6	£21 0
4 × 9	26 0	3 × 11	25 0
4 × 8	25 0	2 × 11	26 0
4 × 7	23 0	3 × 9	24 0
3 × 8	22 0	2½ × 9	24 0
3 × 7	22 0	3 × 4½	21 0
2½ × 7	21 0	3 × 4	21 0

PLANED BOARDS.

1 × 11	£30 0	1 × 9	£28 0

PLAIN EDGE FLOORING.

Inches.	per sq.	Inches.	per sq.
⅜	18/-	1¼	30/-
½	21/-	1½	34/-
1	24/-		

TONGUED AND GROOVED FLOORING

Inches.	per sq.
1	24/-
1¼	30/-
1½	34/-

MATCHING (BEST).

Inches.	per sq.
⅜	16/6
½	19/-
1	24/-

Ins. BATTENS.	s. d.	SAWN LATHS.	s. d.
¾×2	per 100 ft. 2 6	Per bundle	2 6

1" AND UP THICK.

	£ s. d.	£ s. d.
Dry Austrian Wainscot, per ft. cube	0 16 0	to 0 18 0
Dry American and/or Japanese Figured Oak, ft. cube	0 14 0	to 0 15 0
Dry American and/or Japanese Plain Oak, ft. cube	0 10 0	to 0 13 0
Dry sq. edged Honduras Mahogany, ft. cube	0 15 0	to 0 18 0
Dry Log cut Honduras Mahogany, ft. cube	0 16 0	to 1 1 0
Dry Cuba Mahogany, ft. cube	1 1 0	to 1 10 0
Dry Teak, ft. cube	0 13 0	to 0 15 0
Dry American Whitewood, ft. cube	0 10 0	to 0 14 0
Best Scotch Glue, per cwt.	4 10 0	to —
Liquid Glue, per cwt.	4 7 0	to 5 10 0

SLATES.

First quality slates from Bangor or Portmadoc carriage paid in full truck loads to London Rate Station. Per 1,000.

	£ s. d.		£ s. d.
24 by 12	32 18 4	18 by 10	18 12 11
22 by 12	29 17 11	18 by 9	16 9 2
22 by 11	27 14 2	16 by 10	15 12 6
20 by 12	26 5 0	16 by 8	12 3 9
20 by 10	22 10 0		

TILES.

Delivered at London rate stations in full truckloads of not less than 6 tons.

	Per 1,000. f.o.r. London.
Best machine-made tiles from Broseley or Staffordshire district	5 7 6
ditto hand-made ditto	5 17 6
Ornamental ditto	6 2 6
Hip and valley tiles (per dozen) Hand-made	0 9 6
Machine-made	0 9 0

METALS.

JOISTS, GIRDERS, &c., TO LONDON STATION, PER TON—

	£ s. d.
R.S. Joists, cut and fitted	12 10 0
Plain Compound Girders	14 10 0
„ „ Stanchions	16 10 0
In Roof Work	19 10 0

MILD STEEL ROUNDS.—To London Station, per ton

Diameter.	£ s. d.	Diameter.	£ s. d.
⅜ in.	12 0 0	⅞ in. to ¼ in.	10 15 0
½ in.	11 0 0	½ in. to 2½ in.	10 10 0

WROUGHT-IRON TUBES AND FITTINGS— (Discount off List for lot of not less than £7 net value delivered direct from Works, 2½ per cent. less above gross discounts, carriage forward, if sent from London Stocks.)

	Tubes. Wrought Mild Steel.	Tubes. Genuine Staffs. Iron.	Fittings. ¼ in. and under.	Fittings. Over ¼ in.	Flanges. ¼ in. and under.	Flanges. Over ¼ in.
	%	%	%	%	%	%
Gas	67½	50	42½	45	52½	55
Water	63½	46½	37½	40	47½	50
Steam	60	42½	32½	35	42½	45
Galv. gas	55	37½	32½	35	42½	45
Galv. water	50	32½	27½	30	37½	40
Galv. steam	45	27½	22½	25	32½	35

C.I.—HALF-ROUND GUTTERS—London Prices ex Works

Per yd. in 6 ft. lengths.	Gutters.	Angles and Nozzles.	Stop Ends.
3 in.	1/3½	11½d.	3½d.
3½ in.	1/4½	1/1½	3½d.
4 in.	1/6	1/3	3½d.
4½ in.	1/7½	1/4½	4½d.
5 in.	1/10½	1/6½	5½d.
O.G. GUTTERS.			
3 in.	1/8	1/4½	3½d.
3½ in.	1/8	1/4½	3½d.
4 in.	1/9½	1/4½	3½d.
4½ in.	1/11½	1/7½	4½d.
5 in.	2/4½	1/10½	5½d.

RAIN-WATER PIPES, &c.

per yd. in 6 fts.	Pipe.	Bends, stock angles.	Branches, stock angles.
2 in. plain	1/10½	1/3	1/9½
2½ in. „	2/0½	1/4½	2/1½
3 in. „	2/6	1/9	2/7½
3½ in. „	2/11½	2/0½	3/0½
4 in. „	3/5	2/6½	3/8½

L.C.C. COATED SOIL PIPES—London Prices ex Works.

	Pipe. s. d.	Bends, angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6 fts. plain	3 3	2 4½	2 10
2½ in. „	3 9	2 7½	3 7
3 in. „	4 6	2 10	4 2½
3½ in. „	4 11½	3 7	4 11½
4 in.	5 5½	4 0½	5 9

L.C.C. COATED DRAIN PIPES—London Prices ex Works

	Pipe. s. d.	Bends, stock angles. s. d.	Branches. s. d.
3 in. per yd. in 9ft. lengths	4 4	5 1	8 0½
4 in. „ „	6 2	5 8	10 0
5 in. „ „	7 2	10 10	17 1
6 in. „ „	8 6	13 2	21 9

Gasken for jointing, 38/6 per cwt.

IRON—	Per ton in London. £ s. d.		£ s. d.
Common bars	13 0 0	to	14 10 0
Staffordshire Crown Bars— Good merchant quality	14 5 0	to	15 15 0
Staffordshire Marked Bars	16 5 0	..	17 5 0
Mild Steel Bars	10 0 0	..	11 0 0
Steel Bars, Ferro-Concrete quality, basis price	10 0 0	..	11 0 0
Hoop iron, basis price	12 0 0	..	13 0 0
„ Galvanised	27 0 0	..	28 0 0
Soft Steel Sheets, Black— Ordinary sizes, to 20 g.	13 5 0	..	14 5 0
„ „ „ 24 g.	14 5 0	..	15 5 0
„ „ „ 26 g.	16 5 0	..	17 5 0
Sheets Flat Best Soft Steel, C.R. and C.A. quality— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 10 0	..	16 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 22 g. and 24 g.	16 10 0	..	17 10 0
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 26 g.	18 10 0	..	20 10 0
No. 1 quality £4 per ton extra.			
Flat and Galvanised Corrugated Sheets— Ordinary sizes, 6 ft. to 9 ft. to 20 g.	18 0 0	..	19 0 0
Ordinary sizes, 6 ft. to 9 ft. to 22 g. and 24 g.	18 10 0	..	19 10 0
Ordinary sizes, 6 ft. to 9 ft. to 26 g.	21 10 0	..	22 10 0
Sheets Galvanised Flat, Best quality— Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	22 0 0	..	23 0 0
Best Soft Steel Sheets, 22 g. and 24 g.	24 0 0	..	26 0 0
Best Soft Steel Sheets, 26 g.	25 10 0	..	26 10 0
Cut Nails, 3 in. to 6 in.	19 0 0		

(Under 3 in. usual trade extras.)

METAL WINDOWS.—Standard sizes, suitable for complete houses, including all fittings, painting two coats, and delivery to job, average price about 1s. 4d. to 1s. 7d. per foot super.

LEAD, &c.

(Delivered in London.)

	£ s. d.
LEAD—Sheet, English, 4 lb. and up	28 0 0
Pipe in coils	28 10 0
Soil pipe	31 10 0
Compo pipe	32 10 0

NOTE.—Country delivery, 20s. per ton extra; lots under 3 cwt. 3s. per cwt. extra, and over 3 cwt. and under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes. 5s. cwt. extra.

Oil lead, ex London area, at Mills per ton	18 5 0

COPPER.

	s. d.
Seamless Copper tubes (basis) per lb.	1 1
Strong sheet „	1 0
Thin „	1 1
Copper nails „	2 3
Copper wire „	2 4

PLUMBERS' BRASS WORK.

Delivered in London.

NEW RIVER PATTERN SCREW DOWN BIB COCKS FOR IRON.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
29/-	45/-	76/-	153/-	246/-	510/- per doz.

NEW RIVER PATTERN SCREW DOWN STOP COCKS AND UNIONS.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
41/6	62/-	92/-	174/-	300/-	588/- per doz.

RIVER PATTERN SCREW DOWN MAIN FERRULES.

½ in.	¾ in.	1 in.
39/6	60/-	116/6 per doz.

CAPS AND SCREWS.

1¼ in.	1½ in.	2 in.	3 in.	3½ in.	4 in.
7/6	10/-	14/-	23/-	30/-	42/- per doz.

DOUBLE NUT BOILER SCREWS.

½ in.	¾ in.	1 in.	1¼ in.	1½ in.	2 in.
7/6	11/-	17/-	29/-	36/-	63/- per doz.

BRASS SLEEVES.

1¼ in.	2 in.	3 in.	3½ in.	4 in.
10/-	12/-	20/-	24/-	31/- per doz.

NEW RIVER PATTERN CROYDON BALL VALVES, S.F.

¼ in.	¾ in.	1 in.	1¼ in.	1½ in.
35/-	56/-	98/-	162/-	228/- per doz.

DRAWN LEAD P. & S. TRAPS WITH BRASS CLEANING SCREW.

	1¼ in.	1½ in.	2 in.	3 in.
8 lbs. P. traps	33/-	41/-	56/-	101/- per doz.
8 lbs. S. traps	35/-	45/-	66/-	126/- „

TIN.—English Ingots, 3/1 per lb. SOLDER.—Plumber's 1/3, Tinmen's 1/6, Blowpipe 1/7 per lb.

PAINTS, &c.

		s. d.
Raw Linseed Oil, in pipes	per gallon	0 2 11
„ „ „ in barrels	„	0 3 1
„ „ „ in drums	„	0 3 3
Boiled „ „ in barrels	„	0 3 3
„ „ „ in drums	„	0 3 6
Turpentine in barrels	„	0 3 10
„ in drums (10 galls.)	„	0 4 0
Genuine Ground English White Lead, per ton (In not less than 5-cwt. casks.)		50 0 0

* The information given on this page has been specially compiled for THE BUILDER, and is copyright. The aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information

PRICES CURRENT OF MATERIALS (*contd.*)

PAINTS, &c. (*contd.*)

		£	s.	d.
Genuine White Lead Paint—"Father Thames," "Nine Elms," "Park," "Supremus," "St. Paul's," "Morganswyte," "Polacco," "J." Brand, and other best brands (in 14 lb. tins) not less than 5 cwt. lots	per ton delivered	68	10	0
Red Lead, Dry (packages extra)..	per ton	38	10	0
Best Linseed Oil Putty	per cwt.	0	15	0
Filicol	,,	0	15	6
Size. XD quality	1kn.	0	3	6

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

	Per ft.		Per ft.
15 oz. fourths ..	2½d.	32 oz. fourths	6½d.
15 ,, thirds ..	3½d.	32 ,, thirds	8½d.
21 ,, fourths ..	3½d.	Obscured Sheet, 15 oz.	3½d.
21 ,, thirds ..	4½d.	,, ,, 21 ,,	4½d.
26 ,, fourths	4½d.	Fluted 15oz.6½d.,21oz.	9d.
26 ,, thirds ..	6½d.	En'lled 15 oz.4½d.,21oz.6½d.	

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per ft.
⅛ Rolled plate	4½d.
3/16 Rough rolled	5½d.
¼ Rough rolled	5½d.
Figured Rolled, Baltic, Oceanic, Arctic Stippolyte, and small and large Flemish White	5½d.
Ditto, tinted	8½d.
Rolled Sheet	4½d.
White Rolled Cathedral	4½d.
Tinted do.	6½d.

Cast plate is same price as rough rolled.

VARNISHES, &c.

		Per Gallon £	s.	d.
Oak Varnish	Outside	0	14	0
Fine ditto	ditto	0	16	0
Fine Copal	ditto	0	18	0
Pale Copal	ditto	1	0	0
Pale Copal Carriage	ditto	1	4	0
Best ditto	ditto	1	12	0
Floor Varnish	Inside	0	18	0
Fine Pale Paper	ditto	0	18	0
Fine Copal Cabinet	ditto	1	2	6
Fine Copal Flatting	ditto	1	0	6
Hard Drying Oak	ditto	0	18	0
Fine Hard Drying Oak	ditto	0	19	0
Fine Copal Varnish	ditto	1	0	0
Pale ditto	ditto	1	2	0
Best ditto	ditto	1	12	0
Best Japan Gold Size		0	12	6
Best Black Japan		0	10	6
Oak and Mahogany Stain (water)		0	12	0
Brunswick Black		0	7	6
Berlin Black		0	14	6
Knotting (patent)		1	5	0
French and Brush Polish		0	17	0
Liquid Dryers in Terebine		0	9	0
Cuirass Black Enamel		0	7	0

PATENTS

APPLICATIONS PUBLISHED.*

279,928.—E. W. Roberts : Erection of floors and ceilings.

279,954.—Sir A. Herbert and P. V. Vernon : Mechanism for clamping together concentrically-mounted members.

279,981.—W. J. Gooding : Block brick or slab for building or walling.

279,985.—T. Thompson : Water-heating means in domestic ranges.

280,011.—A. C. Brown and J. T. Hinds : Materials for use in making or repairing roads.

280,018.—N. S. Chedburn : Shutters for use in the manufacture of concrete walls.

280,026.—W. Faragher : Weatherproof doors.

280,066.—R. A. Ryves and M. E. Williams : Manufacture of machine-made tiles, slabs and blocks.

280,071.—A. Smith and A. E. Jones : Blocks for building construction.

280,074.—J. M. Ogg : Moulding of parts of buildings and structures *in situ*.

267,494.—F. Armani : Floor and ceiling construction.

280,104.—F. Trachsel, J. Wiedmer and D. Zigerli : Process for the production of objects of artificial stone.

280,108.—G. Burges and Barker & England, Ltd. : Apparatus for collecting dust caused while racing or trueing the sides of grindstones.

280,129.—N. Thomas : Manufacture of paving-tiles.

280,289.—D. Anderson & Son, Ltd., and A. Reynolds : Form of lathing applicable for use in the construction of buildings.

* All these applications are now in the stage in which opposition to the grant of Patents upon them may be made.

THE SCOTTISH BUILDER

NEW BUILDINGS IN SCOTLAND

Glasgow. — Building. — Among linings granted at a sitting of Glasgow Dean of Guild Court were :—Queen's Park Football Club, Ltd.—alterations and additions to grand stand and press box at Hampden Park ; Corporation Parks Department—bowling pavilion at Springburn Park.

Inverbervie.—Housing.—The Town Council have agreed to erect two blocks of houses at the new Public Park site, and one block at Townhead.

Dundee.—Buildings.—Plans and sections of the following proposed new buildings, etc., have been lodged at the office of the City Engineer :—Clepington-road — additions for the Trustees of Clepington Estate (Messrs. Mills & Shepherd, architects, 9, South Tay-street); Fort-street, Broughty Ferry—shop for Messrs. Robert Easson & Co. (Mr. W. M. Wilson, architect, Baltic Buildings).

Elgin.—Baths.—Tenders are being invited by the Town Council for the erection of baths in North-lane. Mr. A. A. Turiff is the Burgh Surveyor.

Elgin.—Houses.—The Elgin Town Council has decided to resume building, and the Housing Committee has been instructed to prepare a new scheme and select sites.

Glasgow.—Additions.—The Health Committee of the Corporation recommend a plan for the erection of a new observation ward at Belvedere Hospital, to accommodate 32 patients, at an estimated cost of £14,600.

Glasgow. — Housing. — For the various works for the construction of 30 houses at Keppochhill-road offers amounting to £11,264 are recommended by the Housing Committee for acceptance.

Clydebank.—Houses.—The Town Council are inviting tenders for the erection of 32 houses at Whitecrook housing site.

Aberdeen.—Building.—The Governors of Robert Gordon's Colleges have considered proposals involving an expenditure of about £40,000 for building work, etc., at the Technical College.

Barrhead.—Housing.—The Barrhead Town Council have agreed to erect 222 houses in the grounds of the Arthurlie estate.

Dundee.—Remodelling.—Plans are being prepared for the re-modelling of Her Majesty's Picture House, by which the sitting accommodation will be increased to over 2,000.

Dundee.—Alterations.—The scheme for alterations and extensions to the La Scala Picture House, which is to cost £50,000, and provide accommodation for 1,640 persons, has been approved.

Dunfermline.—Extension.—To meet the cost of doubling the accommodation of the Dunfermline and West Fife Hospital, estimated at £50,000, subscriptions amounting to £25,530 have been received.

Edinburgh. — Building. — The Edinburgh Dean of Guild Court has passed the following :—Edinburgh City Mission—mission hall at Logie Green-road; Miss E. C. Frier—house, shop, and garage at St. John's-road, Corstorphine; Francis M. Hogg and another—bungalow and garage at Captain's-road, Liberton; Church of Scotland General Trustees—additions and alterations at St. Margaret's Parish Church, Prospect-terrace; H.K. Motor Engineering Co.—16 lock-ups at London-road.

Gourock.—Housing. — At a meeting of Gourock Town Council it was intimated that the Scottish Board of Health had approved the Council's scheme for the erection of 21 two-apartment houses and 15 three-apartment houses in Cardwell-road, and 12 two-apartment houses and six three-apartment houses in Sharp-street. The houses will cost about £15,000.

BUILDING TRADE WAGES IN SCOTLAND.*

The following are the present rate of wages in the building trade in the principal towns of Scotland. Every endeavour is made to ensure accuracy, but we cannot be responsible for errors that may occur.

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers—Masons'‡ Bricklayers'‡ Plasterers'†
Aberdeen	1/8	1/8½	1/8	1/8	1/8	1/8	1/7	10½d. to 1/1
Airdrie	1/8	1/8	1/8	1/8	1/8	—	1/0½	1/3
Alexandria	1/8	1/8	1/8	1/8	1/8	1/8	—	1/2½ to 1/3½
Arbroath	1/6½	1/6½	1/6½	1/7½	1/6½	1/8½	1/5½	1/1
Ayr	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/2½
Bathgate	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/2 to 1/3
Blairgowrie	1/7	1/7	1/7	1/7½	1/5	1/7	1/4	10d. to 1/-
Bo'ness	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3
Coatbridge	1/8	1/9	1/8	1/8	1/8	—	1/6½	1/3½
Dumbarton	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Dumfries	1/6½	1/6½	1/6½	1/7½	1/6½	1/6½	1/6½	1/2
Dundee	1/7½	1/7½	1/7½	1/9	1/7½	1/7½	1/8	1/3
Dunfermline	1/7½	1/7½	1/7½	1/9	1/7½	1/7½	1/7½	‡1/2½ †1/3-1/3½
Edinburgh	1/7½	1/7½	1/7½	1/9	1/7½	1/7½	1/8	1/3½
Falkirk	1/7½	1/7½	1/7	1/8	1/7	1/7	1/6½	1/2½
Fort William	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/2
Galashiels	1/6½	1/7	1/6½	1/7	1/6½	1/6½	1/7	1/2
Glasgow	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/3½
Greenock	1/7½	1/7½	1/7½	1/8½	1/7½	1/7½	1/7	1/2½
Hamilton	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3½
Hawick	1/7	1/7	1/7	1/7-1/7½	1/7	1/7	1/7	1/2½
Helensburgh	1/7½	1/7½	1/7½	1/8½	1/7½	1/7½	1/7	1/2½
Inverness	1/6	1/6	1/6	1/6	1/6	1/6	1/6	1/- to 1/2
Kilmarnock	1/7½	1/7½	1/7½	1/8½	1/7½	1/7½	1/8	1/2½
Kirkcaldy	1/7½	1/7½	1/7½	1/9	1/7½	1/7½	1/8	‡1/2½ †1/3-1/3½
Kirkwall	1/5	1/5	1/4	1/5	1/5	1/4	1/4	1/-
Lanark	1/8	1/8	1/8	1/9	1/8	1/8	1/6	1/- to 1/2
Leith	1/7½	1/7½	1/7½	1/9	1/7½	1/7½	1/8	1/3½
Motherwell	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3½
Perth	1/8	1/8	1/8	1/9	1/8	1/8	1/6½	1/3
Stirling	1/7½	1/7½	1/7½	1/9	1/7½	1/7½	1/7½	1/2½
Stirlingshire (Eastern District)	1/7½	1/9	1/7½	1/9	1/7½	1/7½	1/8	1/2½
Wishaw	1/8	1/8	1/8	1/9	1/8	1/8	1/7	1/3½

* The information given in this table is copyright. The rates of wages in the various towns in England and Wales are given on page 595.

CURRENT PRICES FOR BUILDING WORK IN LONDON*

EXCAVATOR.

		s.	d.
Digging and throwing or wheeling and filling carts, and carting away to shoot—6 ft. deep	per yard cube	11	0
Add if in clay	" "	1	0
Add for every additional depth of 6 ft.	" "	0	6
Planking and strutting to trenches	per foot super	0	5
Do. to sides of excavation, including shoring	" "	1	0

CONCRETOR.

Portland cement concrete in foundation 1 to 6	per yard cube	38	0
Add if in underpinning in short lengths	" "	7	0
Add if in floors 6 in. thick	" "	3	3
Add if in beams	" "	3	9
Add if aggregate 1 : 2 : 4	" "	10	0
Add for hoisting not exceeding 10 ft. beyond the first 10 ft.	" "	2	6

BRICKLAYER.

		£	s.	d.
Reduced brickwork in lime mortar and Fletton bricks	per rod	32	0	0
Add if in stocks	"	7	10	0
Add if in Staffordshire blues	"	22	0	0
Add if in Portland cement and sand	"	1	10	0

FACINGS.

Extra for facing in English or Flemish bond for every 10s. per 1,000 over the price of the common bricks	per ft. super	0	0	1½

POINTING.

Neat flat struck or weathered joint	" "	0	0	3

ARCHES.

Extra only to the price of ordinary brickwork :—				
Fair external in half brick rings	" "	0	0	10
Axed in stocks	" "	0	1	9
Rubbed and gauged jointed in putty camber or segmental	" "	0	6	0

SUNDRIES.

Damp course in double course of slates breaking joint and bedded in Portland cement	" "	0	1	0
Setting ordinary register grates and stoves	each	1	0	0
Setting kitchener, including forming flues, &c., with all necessary fire bricks	"	4	15	0

ASPHALTER.

		s.	d.
Half-inch horizontal damp course	per yard super	4	6
Three-quarter-inch vertical damp course	" "	9	6
Three-quarter-inch on flats in two thicknesses	" "	6	3
Angle fillet	per foot run	0	3
Skirting and fillet 6 in. high	" "	1	2

MASON.

York stone templates fixed	per foot cube	13	0
York stone sills fixed	" "	22	0
Bath stone and all labour fixed	" "	10	6
Beer stone and all labour fixed	" "	15	0
Portland stone fixed	" "	20	0

SLATER.

Welsh 16 in. × 8 in. 3 in. lap, including nails	per square	72	9
Do. 20 in. × 10 in. Do. Do.	"	80	9
Do. 24 in. × 12 in. Do. Do.	"	90	0

CARPENTER AND JOINER.

Fir framed in plates	per foot cube	5	0
Do. joists	" "	5	6
Do. roofs, floors and partitions	" "	6	0
Do. trusses	" "	8	6

		¾″	1″	1½″	2″
Deal rough close boarding	per sq.	35/6	40/-	45/-	72/-

		s.	d.
Flat centering for concrete floor, including struts or hangers	"	50	0
Do. to beams	per ft. sup.	0	11
Centre for arches	"	1	6
Gutter boards and bearers	"	1	0

FLOORING.

		¾″	1″	1½″	1¾″
Deal-edges shot	per sq.	—	44/6	53/-	60/6
Do. tongued and grooved	"	—	49/-	57/6	65/-
Do. matchings	"	45/-	51/-	—	—
Moulded skirting, including backings and grounds	per ft. sup.	1/6	1/9	2/-	2/6

SASHES AND FRAMES.

		s.	d.
One-and-a-half moulded sashes or casements	per foot super	1	10
Two Do. Do. Do.	" "	2	1
Add for fitting and fixing	" "	0	3
Deal-cased frames with 1 in. inner and outer linings, 1¼ in. pulley stiles tongued to linings, hard wood sills with 2 in. moulded sashes in squares, double hung, double hung with pulleys, lines and weights; average size	" "	3	9

DOORS.

		1¼″	1¾″	2″
Two-panel square framed	per ft. sup.	2/1	2/4	2/6
Four-panel Do.	"	2/5	2/8	2/11
Two-panel moulded both sides	"	2/8	2/11	3/2
Four-panel Do. Do.	"	2/11	3/2	3/5

CARPENTER AND JOINER—continued.

FRAMES.

		s.	d.
Deal wrot moulded and rebated	per foot cube	14	0

		1″	1¼″	1½″
Plain deal jamb linings framed	per ft. sup.	1/7	1/8	1/11
Deal shelves and bearers	"	1/4	1/6	1/9
Add if cross-tongued	"	2d.	2d.	2d.

STAIRCASES.

	1″	1¼″	1½″	2″	2½″
Deal treads and risers in and including rough brackets	2/1	2/4	2/9	—	—
Deal strings wrot on both sides and framed	1/8	2/-	2/2	2/8	—

		s.	d.
Housings for steps and risers	each	0	11
Deal balusters, 1 in. × 1¼ in.	per ft. run	0	9
Mahogany handrail : average, 3 in. × 3 in.	" "	6	0
Add if ramped	" "	12	0
Add if wreathed	" "	24	0

FIXING ONLY IRONMONGERY (INCLUDING SCREWS).

6 in. barrel bolts	8½d.	Rim locks	2/-
Sash fasteners	11½d.	Mortice locks	4/6
Casement fasteners	1/5	Patent spring hinges and letting into floor and making good	19/-
Casement stays	1/2		
Cupboard locks	1/5		

FOUNDER AND SMITH.

		s.	d.
Rolled steel joists	per cwt.	16	3
Plain compound girders	"	19	0
Do. stanchions	"	21	9
In roof work	"	27	6

RAIN-WATER GOODS.

		3″	4″	5″	6″
Half-round plain rebated joints	ft. run	1/6	1/9	2/-	2/6
Ogee Do. Do.	"	1/9	2/-	2/6	3/3
Rain-water pipes with ears	"	1/9	2/7	—	—
Extra for shoes and bends	each	4/4	5/11	—	—
Do. stopped ends	"	1/11	2/4½	3/7	4/-
Do. nozzles for inlets	"	2/2	2/7	3/10	4/3

PLUMBER.

		s.	d.
Milled lead and laying in flashings and gutters	per cwt.	41	6
Do. Do. in flats	"	40	6
Extra labour and solder in coated cesspools	each	6	9
Welf joint	per ft. run	0	6
Soldered seam	" "	1	3
Copper nailing	" "	0	3

		½″	¾″	1″	1½″	2″	4″
Drawn lead waste	per ft. run	1/2	1/9	2/-	3/4	4/-	—
Do. service	"	1/8	2/2	2/7	3/10	—	—
Do. soil	"	—	—	—	—	—	6/9
Bends in lead pipe	each	—	—	—	—	3/3	8/2
Soldered stop ends	"	1/2	1/8	2/1	2/10	3/6	—
Red lead joints	"	11d.	1/-	1/3	1/11	2/4	4/10
Wiped soldered joints	"	2/10	3/6	4/-	4/11	6/6	9/9
Lead traps and cleaning screws	"	—	—	—	14/7	19/6	—
Bib cocks and joints	"	6/4	9/7	15/4	41/-	—	—
Stop cocks and joints	"	15/4	17/2	25/8	64/-	—	—

PLASTERER.

		s.	d.
Render, float and set in lime and hair	per yard. sup.	2	6
Do. Do. Sirapite	" "	2	9
Do. Do. Keen's	" "	4	0
Add saw lathing	" "	1	7
Add metal lathing	" "	2	6
(Not including hangers or runners, etc., for suspended ceilings.)			
Portland cement screed	" "	2	2
Do. plain face	" "	3	3
Mouldings in plaster	per 1 girth	0	1½
One-and-a-half granolithic pavings	per yard sup.	5	6

GLAZIER.

		s.	d.
21-oz. sheet plain	per foot sup.	0	8½
26-oz. Do.	" "	1	0
Obscured sheet	" "	1	1
⅛-in. rolled plate	" "	0	9
¼-in. rough rolled or cast plate	" "	0	10½
¼-in. wired cast plate	" "	1	4

PAINTER

		s.	d.
Preparing and distempering, 2 coats	per yard sup.	0	9
Knotting and priming	" "	0	7
Plain painting, 1 coat	" "	0	9
Do. 2 coats	" "	1	2
Do. 3 coats	" "	1	9
Do. 4 coats	" "	2	4
Graining	" "	2	3
Varnishing twice	" "	1	9
Sizing	" "	0	3
Flatting	" "	0	7
Enamel	" "	1	1
Wax polishing	per foot sup.	0	6
French polishing	" "	1	2
Preparing for and hanging paper	per piece, 2/- to 4/-		

* These prices apply to *new buildings only*. They cover superintendence by foreman and carry a profit of 10% on the prime cost without establishment charges. A percentage of 1½ should be added for Employers' Liability and National Health and Unemployments Acts and from 1s. 6d. per £100 for Fire Insurance. The whole of the information given on this page is copyright.

TENDERS

(*Continued from page 599*)

Cumbran.—10 houses, on the Penywain housing site, for the Llantarnam U.D.C. Surveyor:—

*King & Co., Newport (Mon.)	£3,660

Dartford.—Improvements to 47, Spital-street, for the M.W.B.:—

D. J. Conner & Sons	£143 0
W. F. Blay, Ltd.	131 0
J. W. Ellingham, Ltd.	125 0
*P. Miller & Son	114 7

Douglas (I. of M.).—Alterations to the offices and premises in Harris-terrace, Douglas, for the Douglas Poor Law Guardians:—

*Eric E. Douglas, Douglas (Isle of Man).

Edinburgh.—For (*a*) extension work at Bonnyrigg school, and (*b*) extension work at West Calder High school, for the Midlothian E.C. Mr. W. Scott, architect. Quantities by (*a*) Messrs. R. & A. K. Smith, and (*b*) Messrs. T. I. S. Watson & Co.:—

(*a*)

Mason Work—	
*J. Cullen, Musselburgh	£2,327 13 11
Joiner Work—	
*H. M. Raitt, Musselburgh	2,187 0 0
Plumber Work—	
*Bonnar & Moffat, Bonnyrigg	913 6 2
Plaster and Cement Works—	
*P. Forsyth, Bonnyrigg	931 1 3
Slater and Harler Works—	
*T. Clapperton, Bonnyrigg	468 17 9
Painter Work—	
*A. Knowles & Son, Bonnyrigg	227 7 3
Asphalte Work—	
*J. Dunlop & Co., Edinburgh	107 0 0
Heating Installation—	
*Mackenzie & Moncur, Ltd., Edinburgh	647 0 0

(*b*)

Mason Work—	
*Wilson Brothers, West Calder	1,853 13 7
Joiner Work—	
*D. Sommerville & Son, West Calder	1,028 12 8
Plumber Work—	
*P. Stirling & Sons, West Calder	499 8 5
Plaster and Cement Works—	
*G. M. Paris, Broxburn	521 1 7
Slater and Harler Works	
*G. M. Paris, Broxburn	350 17 11
Painter Work—	
*J. Weir & Son, West Calder	140 13 11

Epworth (Doncaster).—Repairs to St. Andrew's Church. Mr. A. R. Haynes, architect, 8, Wrawby-street, Brigg:—

*Rudd & Son, Ltd., Grantham	£530

Folkestone.—74 houses on the Canterbury-road and Dover-road housing site, for the Corporation. Mr. A. E. Nichols, Borough Engineer:—

*East Kent Building Co., Adisham	£26,500

Gillingham.—For (*a*) 56 houses, and (*b*) 54 houses, for the Council:—

(*a*) *Bruming	(each)	£326 1 5
(*b*) *Mr. Stinton	(each)	399 10 0

Hemsworth.—New Church of England Boys' School, for the E.C. Messrs. Joseph Berry & Sons, architects, 1, Market-walk, Huddersfield:—

	Approx.
*W. Hanley & Sons, Ltd., Hemsworth	£6,000

Kerry.—Reconstruction of the Castleisland Court-house and Library, for the C.C. Mr. V. D. Doyle, M.E., Co. Surveyor:—

Patrick Courtney, Kenmare, Co. Kerry	£3,497 0
Maurice A. Hannar, Listowel, Co. Kerry	2,848 0
Edward O'Sullivan, Killorglin, Co., Kerry	2,794 0
Maurice Holly, Tarbert, Co. Kerry	2,708 9
Jeremiah Cullinane, Castleisland, Co. Kerry	2,600 0
*James O'Connor, Castleisland, Co. Kerry	2,540 0

King's Langley.—24 cottages, on the Council's housing site in Blackwell-road, for the Hemel Hempstead R.D.C. Mr. T. H. Lighbody, L.R.I.B.A., architect, 32, Alexandra-road, Hemel Hempstead:—

A. J. Eldridge	£14,832 0
C. Miskin & Sons, St. Albans	13,984 0
E. J. Swinford, Watford	13,750 0
Matthews & Welch, Leagrave	13,704 0
Jeffs & Bigley, Letchworth	13,368 0
Kempster & Williams, Watford	12,996 0
E. J. Waterhouse, Chipperfield	12,975 0
Payne Bros., Leavesden	12,713 0
H. Lacey & Sons, Luton	12,520 0
Heels & Sugars, Luton	12,500 0
R. Gilbert, Berkhampstead	12,500 0
Green & Parsons, Abbotts Langley	12,480 0
H. C. Janes, Ltd.	12,460 0
Chas. Huckell, Dane Hill, Sussex	12,387 0
A. Carter, Luton	12,240 0
Blackwell & Mayer, Bexley Heath	11,977 0
R. Burgin, Bovingdon	11,880 0
F. P. Bliss & Son, Bushey	11,800 0
H. E. Scull, Wembley	11,708 4
Thos. Conway, Ltd., Weymouth	11,277 0
Pondac, Ltd., Paddington	10,560 0
J. H. Metcalf, Doncaster	10,200 0
*Herbert King, Garston, Watford	10,092 16

Leicester.—139 houses, for the T.C.:—

*Bodill & Sons, Ltd., Hucknall.

Liverpool.—Sub-station in Donaldson-street, Everton, for the T.C. Land Steward and Surveyor:—

*R. O. Jones & Co., Liverpool.

London.—New offices and show rooms at 108, Fulham Palace-road, S.W., for Bridger Brothers. Mr. Alfred E. Nightingale, architect:—

*G. Jackson, Chiswick.

London.—Electric lighting of new verandahs, at the Brook Hospital, for the M.A.B.:—

Riddle & Goddard, Ltd.	£215 0
Read & Partners, Ltd.	199 10
Toy & Winslow	195 0
T. Clarke & Co., Ltd.	180 0
L. G. Tate & Co., Ltd.	160 0
‡Buchanan & Curwen	142 0

(All of London.)

London.—Erecting automatic telephone exchange and battery room, at the Northern Hospital, for the M.A.B.:—

J. Darch, Ltd.	£225 0 0
White & Johnson	190 0 0
A. H. Inns, Ltd.	187 0 0
C. H. Boyd & Son, Ltd.	162 0 0
L. Hocking & Co.	161 7 7
‡E. Proctor & Sons	158 0 0

(All of London.)

London.—Formation of new covered yard, etc., at the Western Ambulance Station, for the M.A.B.:—

C. H. Boyd & Son, Ltd., London	£6,482 0 0
J. & R. Thompson (London), Ltd., London	6,257 0 0
White & Johnson, London	6,088 6 5
Arthur Logan, London	5,888 0 0
‡Carrington, Thomas & Co., Ltd., Beckenham	4,815 16 0

London.—Cleaning, painting and repairs, at the Grove Hospital, for the M.A.B.:—

White & Johnson, London	£4,450 0 0
E. D. Winn & Co., Ltd., London	3,467 0 0
Falkus Bros., Ltd., London	3,075 0 0
E. C. Sames & Co., London	2,951 0 6
W. Sanford, Thornton Heath	2,838 12 0
Douglass, Halse & Co., Ltd., London	2,745 0 0
L. Kazak & Co., London	2,298 0 0
F. Kinnaird & Co., Ltd., London	2,296 0 0
E. Proctor & Sons, London	2,180 0 0
P. Miller & Son, Dartford	2,168 0 0
A. H. Inns, Ltd., London	2,130 0 0
J. Hocking & Co., London	2,071 0 0
F. Firth, Shipley	1,859 0 0
W. E. Greenwood & Son, Ltd., London	1,698 0 0

London.—Providing new stoves and alterations to drying horses, at the Paddington Casual Ward, for the M.A.B.:—

White, Bays & Davey	£243
‡C. H. Boyd & Son, Ltd.	147

(All of London.)

London.—Extension of the playground at East-lane school, and removal of the boys' offices to another part of the site, for the L.C.C.:—

E. C. Sames & Co.	£1,760 12
Castle Bros., Ltd.	1,255 0
Hill & Gurr	1,235 0
R. Woollaston & Co.	1,224 0
J. Garrett and Son, Ltd.	1,185 0
T. D. Leng	1,110 0
H. King & Son	1,104 0
H. W. Spinks	1,094 0
J. & C. Bowyer, Ltd.	1,080 0
Sims & Russell	1,069 0
W. J. Dixon & Son	1,027 0
*Triggs & Co., Ltd.	1,018 0
Architect's estimate	1,145 0

(All of London.)

ESTIMATING ON RIGHT LINES

Everyone whose business it is to quote for building work should master the principles upon which estimating is based. These principles are clearly explained and illustrated in

'HOW TO ESTIMATE'

by J. T. REA,

a unique and invaluable work which is not excelled in thoroughness or in scope by any similar book known.

Fourth edition (now ready). 540 pages. Price 15s. net (by post 15s. 9d.). Containing thousands of prices and hundreds of examples of analysis, showing how a builder can make up rates for himself. In view of the difficulty of fixing standard prices under present conditions, the author has included an important series of Adaptation Tables and Percentages *which show how rates may be adjusted to meet variations at any time.*

Before purchasing any other book on this vitally important subject, you are invited to inspect this—the standard work which is in use by over 20,000 builders.

A Copy will be sent by return, and your Remittance refunded if the Book does : : not satisfy your requirements : :

B. T. BATSFORD, LTD.

Publishers, 94 High Holborn, London, W.C.

London.—Heating work at following schools, for the L.C.C.:—

Bow and Bromley—Wellington-road—	
The Fretwell Heating Co.	£1,173
The Brightside Foundry and Engineering Co., Ltd.	1,164
Colley, Meikle & Co., Ltd.	1,161
Saunders & Taylor, Ltd.	1,160
H. J. Cash & Co., Ltd.	1,144
Thames Bank Iron Co., Ltd.	1,141
John Biggs	1,125
*Clark, Hunt & Co., Ltd.	1,097
Architect's estimate	1,180
Mile End—Cephas-street—	
Central Heating, Ltd.	£2,000
J. & F. May	1,919
Thames Bank Iron Co., Ltd.	1,744
J. Jeffreys & Co., Ltd.	1,725
The Fretwell Heating Co.	1,687
J. T. Meredith & Co., Ltd.	1,640
Wm. Griffiths, Sons & Cromwell, Ltd.	1,589
Heywood & Bryett	1,587
*Clark, Hunt & Co., Ltd.	1,577
Architect's estimate	1,700
Lewisham, E.—Durham-hill (Downham site 4)—	
J. & F. May	£1,680
H. J. Cash & Co., Ltd.	1,515
The Fretwell Heating Co.	1,474
Thames Bank Iron Co., Ltd.	1,451
Beaven & Sons, Ltd.	1,447
Clark, Hunt & Co., Ltd.	1,435
J. T. Meredith & Co., Ltd.	1,435
*W. G. Cannon & Sons, Ltd.	1,392
Architect's estimate	1,450

(All of London.)

London.—Erection of the two blocks of dwellings, to be known as Radford House and Hartnoll House, which are to be built on Ring Cross estate (George's-road area), Islington, for the L.C.C.:—

C. P. Roberts & Co., Ltd.	£73,300 0 0
Wm. Walkerdine, Ltd.	70,719 18 8
F. & A. Bayntun	69,685 0 0
Fred & T. Thorne	68,808 0 0
Patman & Fotheringham, Ltd.	67,950 0 0
Hill & Gurr	67,697 0 0
R. Woollaston & Co.	66,916 0 0
Canonbury Construction Co., Ltd.	66,948 0 0
Albert Monk	65,190 0 0
R. J. Rowley	65,000 0 0
A. E. Symes	64,388 0 0
A. T. Rowley	63,890 0 0
Allen Fairhead & Sons, Ltd.	63,620 0 0
Rowley Brothers, Ltd.	62,985 0 0
J. E. Billings & Co., Ltd.	62,579 0 0
*Gee, Walker & Slater, Ltd.	62,306 0 0
Architect's estimate	64,635 0 0

(All of London.)

(Subject to the approval of M.H.)

London.—Proposed warehouse in Lever-street, E.C. Messrs. Gray & Webb, architects, 18, Baker-street, W.1.:—

Patman & Fotheringham	£9,919
*Hammond & Barr	9,360
Fairweather & Ranger	9,295

London.—Cleaning, painting and repairs, for the M.A.B.:—

Falkus Bros., Ltd., London	£269 0
W. Sanford, Thornton Heath	273 15
W. H. Willson & Co., Bromley	248 12
E. D. Winn & Co., Ltd., London	237 0
E. Proctor & Sons, London	235 0
F. Kinnaird & Co., Ltd., London	203 0
Carrington, Thomas & Co., Ltd., Beckenham	202 0
A. H. Inns, Ltd., London	197 0
L. Kazak & Co., London	184 0
Douglass, Halse & Co., Ltd., London	174 0
‡P. Miller & Son, Dartford	147 0

London.—New drying rooms, at the Paddington Casual Ward, for the M.A.B.:—

A. Logan	£275 0
P. Jones & Co.	170 10
C. H. Boyd & Son, Ltd.	162 0
White & Johnson	145 0
‡L. Kazak & Co.	130 0

(All of London.)

London.—Centralisation of heating and hot water supply systems, at the North-Eastern Hospital, for the M.A.B.:—

J. & F. May, London	£9,300
Brightside Foundry & Engineering Co., Birmingham, Ltd.	9,050
W. G. Cannon & Son, Ltd., London	7,223
National Heating Co., Ltd., London	5,643
Barford & Perkins, Ltd., Peterborough	5,460
‡J. Combe & Son, Ltd., London	4,937

London.—Building work in kitchen and alterations, etc., at the South-Western Hospital, for the M.A.B.:—

P. Jones & Co.	£1,945
C. H. Boyd & Son, Ltd.	1,332
‡Carrington, Thomas & Co., Ltd.	1,185

(All of London.)

Manchester.—New stores in Oldham-street and Back Piccadilly, for Messrs. C. & A. Modes, Ltd. Messrs. North, Robin & Wilsdon, architects, 35 to 39, Maddox-street, W.1.:—

*Russell Building & Contracting Co., Ltd., Manchester.

Fire-proof Floors—
*Fram Reinforced Concrete Co., Ltd., Manchester.

Lifts—
*Etchells, Congdon & Muir, Ltd., Manchester.

Steelwork—
*Redpath, Brown & Co., Ltd., Manchester.

Manchester.—Adaptation of premises as headquarters at the "White House," Middleton-road, Crumpsall, for the Manchester Tramways Athletic Club:—
*Rowland & Shaw, Ltd., Greenfield.

Manchester.—Conversion of premises at 92, Portland-street, for Messrs. W. H. Robinson & Co.:—
*H. Waterfield, Salford.
Steelwork—
*C. C. Dunkerley & Co., Ltd., Manchester.

Marple.—12 houses on the Brindley Farm housing site, for the U.D.C. Mr. D. J. Diver, surveyor:—
*G. Griffiths, Mellor.
(Subject to approval of M.H.)

Meopham.—4 cottages at Longfield-road, for the Strood R.D.C. Mr. L. Randerson, surveyor, Meopham:—
*T. G. Dean, Higham ..... £647 per pair.

Newquay. — Towan Promenade improvement scheme, for the U.D.C.:—
*J. Bellman, Newquay £3,520

Northampton.—Shelter in Cafe-square, for the C.B.:—
*D. Rowell & Co. £180

Northampton.—Covering in certain of the pens in the market, for the C.B.:—
*Dixon & Co., Ltd. £697 5

Plymouth.—Repairs, etc., at the Devonport branch library, for the C.B.:—
*F. H. Crocker & Co. £298 10

Portsmouth.—Range of garages in Cromwell-road, Eastney. Mr. W. J. Wakely, architect and surveyor, Pearl-buildings:—

F. Privett, Southsea	£747 0
John Lay & Co., Portsmouth	694 0
E. W. Payne, North End	675 0
Hellyer & Son, Cosham	665 0
*T. Whatley	554 10

Preston.—Municipal offices in Birley-street, for T.C.:—
T. Croft & Sons, Ltd. £6,850

Preston.—New offices and dressing boxes at the Moor Park Open-Air Bath, for the T.C.:—
*R. Mercer, Ltd., Preston £1,577

Rugby.—For houses at (a) Harborough Magna and (b) Brandon, for the R.D.C.:—
(a) *Adams & Son.
(b) *Corfield & Burton.

Salford.—66 houses on the Littleton-road housing estate, for the City Council:—
*A. Tomkins, Salford £26,184

Skipton.—50 houses on the Carleton-road housing site, for the U.D.C.:—
*Garbutt & England, Cudworth £18,250

Southend-on-Sea.—107 houses and 12 flats at Eastwood-lane, for the Corporation. Mr. Robt. H. Dyer, Borough Engineer:—
*W. L. Allan, Southend-on-Sea £53,545

Thrybergh.—New schools for St. Gerrards, Whinney Hill, for Mr. W. Ward. Messrs. Empsall Clarkson & Clarke, architects, Bradford:—
*J. Hoskins & Sons, Liversedge £8,500

Tobermory.—New school, for the Argyll County E.C. Mr. R. Cameron, Master of Works, Dunoon:—

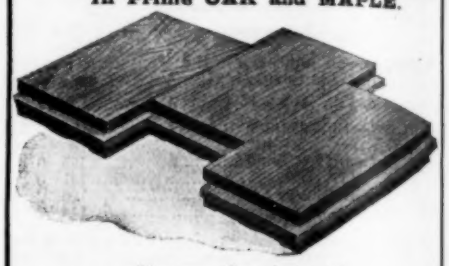
Brick, etc., Work—	
*Donald Livingstone, Fortwilliam	£1,245 7 9
Joiner Work, etc.—	
*Malcolm MacLean, Tobermory ...	889 10 9
Slater and Rough Cast Works—	
*P. & J. Jamieson, Oban	285 12 0
Plumber Work—	
*John McCulloch, Oban	293 5 4
Plaster Work—	
*H. Sinclair & Son, Tobermory ...	135 1 9

Phone PARK 1885 for
HIGH CLASS
PARQUET and WOOD BLOCK FLOORS
in various woods and thicknesses
PORTABLE and SPRING DANCE FLOORS
Ask for Booklet
TURPIN'S PARQUET FLOORING CO.
75, Notting Hill Gate, London, W.11

MODERN SANITATION
without Sewers or Drains
ELSAN Chemical Indoor CLOSET
B. ELSAN MANUFACTURING CO.
34/35, HIGH HOLBORN, LONDON, W.C.1.

J. GLIKSTEN & SON
LIMITED
Specialities in
SEASONED
HARDWOODS
MAHOGANY WALNUT
JAPANESE, AMERICAN and
WAINSCOT OAK, TEAK,
WHITEWOOD, &c.
Registered Office and Wharf
CARPENTERS RD.
STRATFORD
LONDON E.15
Telephone: East 3771 (5 lines)
Telegrams: Gliksten 'Phone London

J. J. ETRIDGE, Jr. Ltd
SLATING AND TILING
SLATE MERCHANTS
CONTRACTORS
Inspections and Reports made on
OLD OR FAULTY ROOFS
in any part of the country.
Telephone: Bishopsgate 1944/5, or write,
Bethnal Green Slate Works,
BETHNAL GREEN LONDON, E.

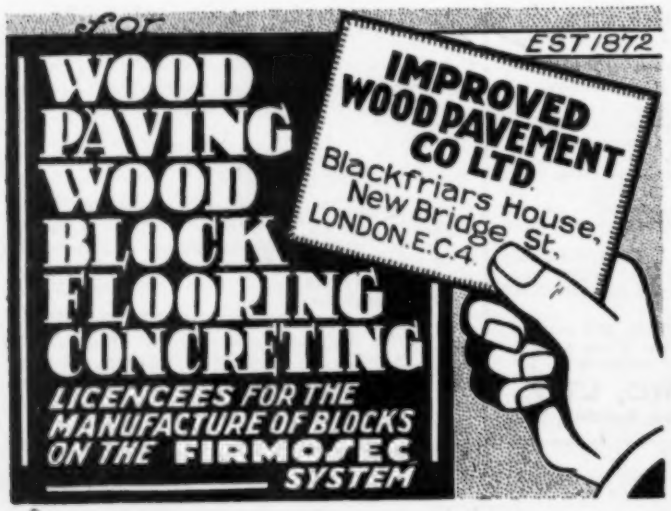
HARDWOOD T & G FLOORING
In Prime OAK and MAPLE.

Also every description of
WOOD BLOCK FLOORING
PARQUET FLOORING
Exceptionally low prices upon application to:
STEVENS & ADAMS, LTD.,
Victoria Works, Point Pleasant, Wandsworth, London S.W.18
Telephone—Putney 4701 (3 lines).

FITZPATRICK & SON
MASONS & PAVIORS
PAVING WORK OF EVERY DESCRIPTION
Largest stock of Second-hand and Redressed (equal to new) Granite Setts in London, at Rock-bottom Prices.
Rectangular and Crazy York Paving. Rockery Stone. Granite Chippings and Tarmacadam.
Spur Stones to order.
Quadrant Blocks in stock.
454 OLD FORD ROAD, LONDON, E.3
'Phone—EAST 4808

HOSPITAL & SCHOOL STOVES
SOLE MAKERS OF
WRIGHT'S IMPROVED AND ALSO SHORLAND'S PATENT WARM AIR VENTILATING PATTERNS.
GEO. WRIGHT (LONDON) LTD
19 NEWMAN ST. OXFORD ST. LONDON, W.1
WORKS: BURTON WEIR, MOTHERHAM

OGILVIE & CO.,
Telephone: Clissold 1288
Many years connected with the late Firm of W. H. Lascelles & Co., of Bunhill Row.
Mildmay Works, Mildmay Avenue, Islington N.
EXPERTS IN HIGH-CLASS JOINERY.
ALTERATIONS AND DECORATIONS. Estimates Free

Telegrams: 'Frolic, Liverpool.' 'Phone 228 Bank
E. B. BURGESS & CO.
6, CASTLE ST., LIVERPOOL.
WOOD BLOCK FLOORING
AND PARQUETRY.



HOWELL J. WILLIAMS
Ltd.
Builders
High-Class Building
and
Joinery Work
11/17, BERMONDSEY STREET
Telephone: HOP 202
LONDON BRIDGE S.E.1
Builders of very many well-known Banks, Office and Business premises. Our works especially convenient for City Building and fittings.